

1/68 U113
12
TM
1943
U.S. Dept. of Army

TM5-4026

WAR DEPARTMENT
Technical manual
MAINTENANCE MANUAL
AND PARTS CATALOG

**DRILL, PNEUMATIC, PORTABLE, REVERSIBLE,
WOOD BORING, NO. 2 MORSE TAPER,
THOR NO. 62, MODEL 958**

INDEPENDENT PNEUMATIC TOOL COMPANY
CHICAGO, ILL.

SEPTEMBER 30, 1943

TM 5-4026

WAR DEPARTMENT

TM5-4026, Maintenance Manual and Parts Catalog, for Drill, Pneumatic, Portable, Reversible, Wood Boring, No. 2 Morse Taper, Thor No. 62, Model 958, published by the Independent Pneumatic Tool Company, is furnished for the information and guidance of all concerned.

(AG 300.7 (6/18/43) PC (C), June 30, 1943.

By order of the Secretary of War:

G. C. MARSHALL
Chief of Staff

Official

J. A. Ulio,
Major General,
The Adjutant General

TM5-4026

WAR DEPARTMENT MAINTENANCE MANUAL AND PARTS CATALOG

**DRILL, PNEUMATIC, PORTABLE, REVERSIBLE,
WOOD BORING, NO. 2 MORSE TAPER,
THOR NO. 62, MODEL 958**

**INDEPENDENT PNEUMATIC TOOL COMPANY
CHICAGO, ILL.**

SEPTEMBER 30, 1943

MANUFACTURED FOR THE CORPS OF ENGINEERS

USPO NUMBERS	CONTRACT NUMBERS	I. P. T. CO. O. NUMBERS	SERIAL NUMBERS
C-4199	W-1122-Eng.-1387	C-155237	All
C-4965	W-1088-Eng.-2179	C-160006	Model 958
C-4903	W-1088-Eng.-2150	C-159892	Serial Numbers

Copyright 1943
by
INDEPENDENT PNEUMATIC TOOL CO.
Chicago, Illinois, U. S. A.

Page I

Printed in U. S. A.

All Service problems and repair parts orders are to be referred to Independent Pneumatic Tool Company, Chicago, Illinois, or any of the branch offices listed below.

INDEPENDENT PNEUMATIC TOOL CO.
600 W. Jackson Blvd.,
Chicago 6, Illinois

BIRMINGHAM 4, ALA.
1411 Third Ave., N.

BOSTON 15, MASS.
78 Brookline Ave.

BUFFALO 2, N. Y.
521 Genesee Bldg.

CLEVELAND 14, OHIO
1740 E. 12th St.

DETROIT 3, MICH.
15605 Woodrow Wilson Ave.

LOS ANGELES 54, CALIF.
6200 E. Slauson Ave.

MILWAUKEE 3, WISC.
2637 W. Clybourn St.

NEW YORK 18, N. Y.
330 W. 42nd St.

PHILADELPHIA 30, PA.
1701 Fairmount Ave.

PITTSBURGH 22, PA.
803 Wabash Bldg.

ST. LOUIS 8, MO.
4044 Forest Park Blvd.

SALT LAKE CITY 1, UTAH
54 E. Fourth South

SAN FRANCISCO 3, CALIF.
315 S. Van Ness St.

SEATTLE, WASH.
1741 1st Ave., S.

TORONTO, ONT.
32 Front St., W.

LONDON, ENGLAND
40 Broadway, S.W.1

FACTORIES: AURORA, ILLINOIS AND LOS ANGELES, CALIF.

Be sure to accompany your request with detailed information covering tool, giving: model number, name, serial number.

4413
13

INTRODUCTION

TM514006 III

1941-5

TABLE OF CONTENTS



SECTION	PAGE
INTRODUCTION	
Title Page	I
Branch Offices of Contractor	II
Table of Contents.	III
General Description.	IV
Specifications	V
Major Unit Identification	VI
Exploded View of Complete Tool	VII
Parts Description.	VIII
OPERATOR'S INSTRUCTIONS	
Before Starting Wood Boring Drill.	1
Lubrication.	1
Operating Air Line Pressure.	1
Drill Bit Inspection	1
Placing Bit in Chuck	2
Connecting Air Hose to Tool.	2
Operation of Drill	2
Twist Throttle Control	2
Reverse Running.	3
Field Service Operations	4
Checking Clamp Screws.	4
Servicing Throttle Control	4
Disassembling and Reassembling Throttle.	5
Air Strainer	5
Field Lubrication.	5
Oil Lubrication.	5
Grease Lubrication	6
Lubrication Specifications	6
Extreme Weather Conditions	7
Preparing Drill for Storage.	7
MAINTENANCE INSTRUCTIONS	
Summary of Servicing Operations.	9
General Information.	9
Major Unit Identification.	9
Exploded View of Tool.	10
Twist Throttle Control Unit.	12
Disassembling of Unit.	12
Reassembling Throttle Handle	12
Throttle Valve Repair and Adjustment	12
Stopping Air Leaksages.	13
Lapping Valve.	13
Motor Unit	14
Grip Handle Parts.	14
Dead Handle Parts.	14
Motor Unit Inspection.	14
Motor Unit Servicing	15
Removing Corliss Valves.	15
Designation of Right and Left Valve Parts.	16
Servicing Corliss Valves and Bushings.	19
Lapping Valves and Bushings.	19
Reassembling Valve Parts	20
Inspection and Replacement of Eccentric Straps and Eccentric	20
Servicing Connecting Rods and Pistons.	21
Lapping Connecting Rods and Pistons.	21
Reassembling Connecting Rods and Pistons	24
Inspection of Rollers and Retainer	24
Inspection of Crank Pinion and Gear Wheel.	25
Inspection of Spindle Bushing.	25
Gear Case Unit	26
Removing Spindle Assembly.	26
No. 18 Gear Wheel.	26
Spindle Packing.	27
Inspection of Rollers and Retainer in Gear Case.	27
Lubrication - Final Servicing Operations	28
Grease Application	28
Oil Application.	28
Lubrication Specification.	28
PARTS LIST	
Sample Requisition	30
Rules for Requisition Preparation.	31
Exploded View, Complete Tool	32
Parts List, Numerical	36
Cross Section, Complete.	34

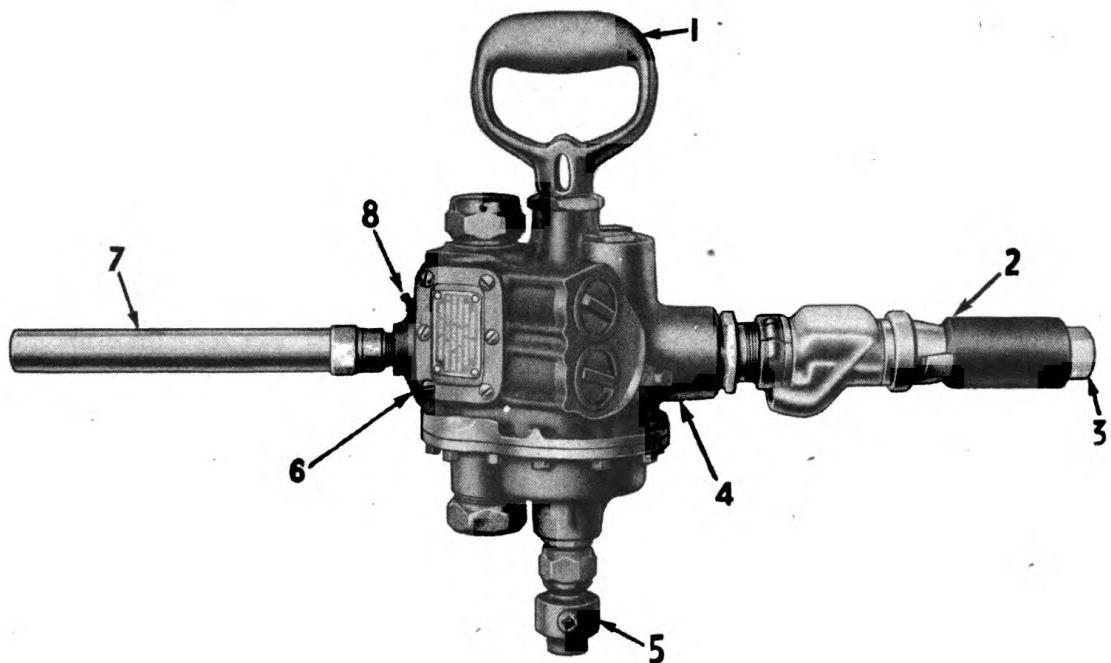
GENERAL DESCRIPTION

The Thor No. 62 Pneumatic Wood Boring Drill is powered by a reversible, four cylinder, reciprocating, piston-type, air motor, designed to operate efficiently on an airline pressure of 90 lbs. per square inch. The drill is equipped with a reversible twist throttle control, dead handle, grip handle, and wood bit chuck designed to accommodate 1/2" diameter straight round shank ship augers and wood bits for boring various holes in wood up to 2" in diameter.

SPECIFICATIONS**Thor No. 62 Wood Boring Drill**

Capacity	up to 2" dia. auger or bit
Speed	950 R.P.M.
Weight	30-3/4 lbs.
Length overall	16"
Spindle offset	2-3/4"
Morse taper	No. 2
Operating Air Line Pressure	90 lbs. per sq. inch

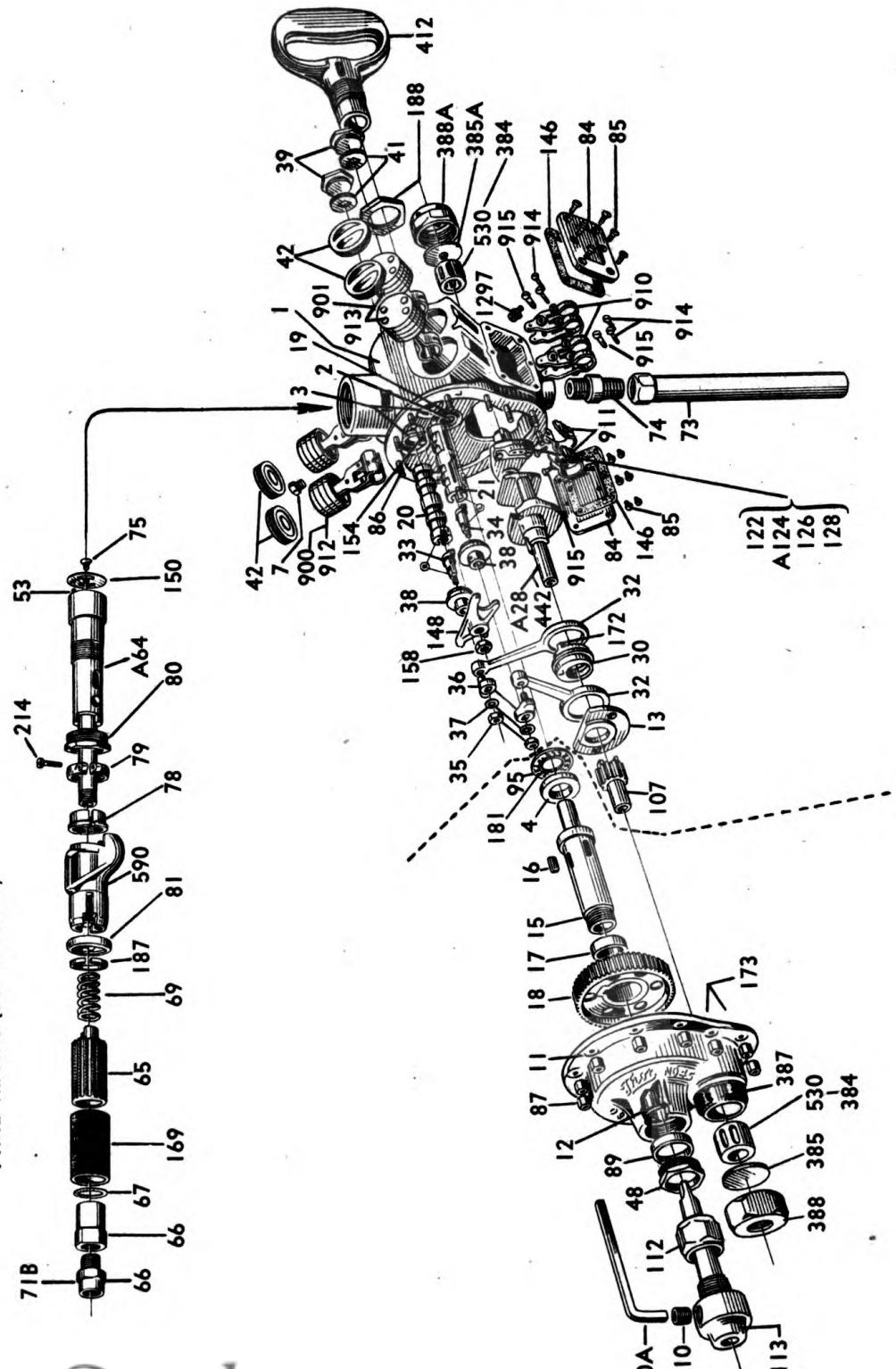


IDENTIFICATION OF MAJOR PARTS***Thor* No. 62 Wood Boring Drill**

1. GRIP HANDLE—securely fastened to the drill by means of a right hand thread and lock nut. May be positioned in any desired direction.
2. TWIST THROTTLE CONTROL—enables operator to start, stop and control both speed and direction of rotation.
3. AIR INLET—a reducer at air hose connection end of the twist throttle is threaded to accommodate a $\frac{1}{2}$ " pipe thread hose nipple. Air strainer inside the reducer filters foreign matter from compressed air entering the tool.
4. OIL PLUG—a red painted oil plug marks the opening through which lubrication is applied to motor valves and their operating parts.
5. CHUCK—accommodates ship augers or wood bits with $\frac{1}{2}$ " dia. straight round shanks.
6. CRANK CHAMBER PLATES—removal provides accessibility to crank chamber parts.
7. DEAD HANDLE—facilitates holding the machine rigidly to prevent turning when boring.
8. GREASE NIPPLE—provides for grease lubrication direct to crank chamber

EXPLODED VIEW OF COMPLETE TOOL

Numbers indicated on this page are only base numbers. For complete part number including required prefixes, and one noun description, see page VII.



**COMPLETE PARTS NUMBERS AND ONE NOUN DESCRIPTIONS FOR ITEMS
SHOWN IN EXPLODED VIEW ON PAGE VI**

Part No.	Description	Part No.	Description
PD-12-1	Cylinder (See Note 1)	PD-2-86	Stud
PD-2-2	Bushing	PD-2-87	Nut
PD-2-3	Bushing	PD-2-89	Packing
PD-2-4	Race	PD-1-95	Retainer
PD-12-7	Plug	PD-6-107	Pinion
PD-2-11	Case (See Note 2)	PD-00-110	Screw
PD-2-13	Plate	PD-62-112	Nut
PD-2-15	Spindle (See Note 3)	PD-62-113	Chuck (See Note 6)
PD-2-16	Key	PD-6-120A	Wrench
PD-2-17	Collar	PD-2-122	Spring
PD-62-18	Gear	PD-2-A124	Mouthpiece
PD-2-19	Race	PD-2-126	Packing
PD-12-20	Valve	PD-2-128	Rivet
PD-12-21	Valve	PD-12-A142	Throttle (See Note 7)
PD-62-A28	Crank (See Note 4)	PD-2-146	Gasket
PD-2-30	Eccentric	PD-2-148	Clamp
PD-2-32	Strap	PD-12-150	Gasket
PD-2-33	Stud	PD-2-154	Stud
PD-2-34	Stud	PD-2-158	Nut
PD-2-35	Nut	PD-BW-169	Sleeve
PD-2-36	Lever	PD-2-172	Pin
PD-2-37	Washer	PD-2-173	Key
PD-2-38	Guide	PD-1-181	Ball
PD-12-39	Cap	PD-12-187	Spring
PD-2-41	Plate	PD-12-188	Nut
PD-2-42	Head	DC-2-214	Screw
PD-2-48	Box	PD-2-384	Roller
PCH-A-53	Pin	PD-2-385	Plate
PD-12-A64	Stem	PD-2-385A	Plate
PD-12-65	Sleeve	PD-2-387	Bushing
PD-12-66	Nut	PD-2-388	Cap
PR-260-66	Bushing (See Note 5)	PD-2-388A	Cap
PD-CC-67	Washer	PD-62-412	Handle
PD-12-69	Spring	PD-62-442	Shaft
PD-0-71B	Strainer	PD-2-530	Bearing (See Note 8)
PD-2-73	Handle	PD-12-590	Valve
PD-2-74	Plug	PD-2-900	Rod and Piston (See Note 9)
PD-00-75	Screw	PD-2-901	Rod and Piston (See Note 10)
PD-12-78	Nut	PD-2-910	Clamp
PD-12-79	Clamp	PD-2-911	Clamp
PD-12-80	Nut	PD-2-912	Rod and Piston
PD-12-81	Sleeve	PD-2-913	Rod and Piston
PD-2-84	Plate	PD-2-914	Screw
PD-2-85	Screw	PD-2-915	Screw
		ACK-1297	Nipple

NOTES

- Note 1 - Includes Nos. 2 Bushing, 3 Bushing, 19 Race, 86 Studs, 154 Stud.
- Note 2 - Includes Nos. 12 Bushing, 173 Key.
- Note 3 - Includes Nos. 4 Race, 16 Key, 17 Collar.
- Note 4 - Consists of Nos. 107 Pinion, 122 Spring, 124 Mouthpiece, 126 Packing, 128 Rivets, 442 Shaft.
- Note 5 - Includes No. 71B Strainer.
- Note 6 - Includes No. 110 Screw.
- Note 7 - Consists of Nos. A64 Stem, 65 Sleeve, 12-66 Nut, 67 Washer, 69 Spring, 75 Screw, 78 Nut, 79 Clamp, 80 Nut, 81 Sleeve, 150 Gasket, 169 Sleeve, 187 Spring, 214 Screw, 590 Valve.
- Note 8 - Includes No. 384 Rollers.
- Note 9 - Consists of Nos. 910 Clamp, 912 Rod and Piston, 914 Screws, 915 Screw.
- Note 10 - Consists of Nos. 911 Clamp, 913 Rod and Piston, 915 Screw.

MEMORANDA

INDEX TO OPERATOR'S INSTRUCTIONS

PAGE

BEFORE STARTING WOOD BORING DRILL

1

Lubrication

Operating Air Line
Pressure

Drill Bit Inspection

Placing Bit in Chuck

Connecting Air Hose
to Tool

OPERATION OF DRILL

2

Twist Throttle Control

Reverse Running

FIELD SERVICE OPERATIONS

4

Checking Clamp Screws

Servicing Throttle Control

Disassembling and
Reassembling Throttle

Air Strainer

FIELD LUBRICATION

5

Oil Lubrication

Grease Lubrication

Lubrication Specifications

EXTREME WEATHER CONDITIONS

7

PREPARING DRILL FOR STORAGE

7

WHAT TO DO

BEFORE STARTING WOOD BORING DRILL

This drill was given a rigid operating test and final inspection before it was shipped from the factory. We recommend that you read and follow the procedure outlined below before starting and placing the machine in service.

LUBRICATION

OIL Lubricant

1. Apply a liberal amount of proper grade oil (see Lubricant chart, Page 6) through No. 66 reducer opening at end of twist throttle handle.
2. Connect air hose to drill.
3. Turn on air to distribute lubrication through drill.
Note: When operating, remove No. 7 oil plug every four hours and apply liberal amounts of oil through oil plug opening.

Grease Lubricant

1. Apply proper grade cup grease (see Lubricant chart, Page 6) sparingly through No. 1297 grease nipple (red painted).
2. Do not fill cylinder or gear case more than 1/3 full of grease.
Note: When operating, apply grease every 4 hours.

OPERATING AIR LINE PRESSURE

1. Check air pressure. Normal operating airline pressure is 90 lbs. per square inch.
 - (a) Low pressure will reduce operating efficiency.
 - (b) High pressures require only that operator be certain to have complete control of the machine, so that he can stop instantly should a bit break.
2. See that 3/4" inside diameter hose is used. This is essential to maintain a sufficient supply of air.

Drill Bit Inspection

1. Inspect the shank end of the ship auger or drill bit to be used.
2. Examine entire bit for flaws.
3. Check screws and nuts to be sure all are tight.

To Place Auger or Bit in Chuck

1. Back out No. 110 setscrew in the No. 113 chuck just far enough to permit the passage of the bit shank.
2. Insert the shank of bit into the No. 113 chuck with flattened section of the shank toward the No. 110 setscrew.
3. Tighten No. 110 setscrew securely with No. 120A chuck wrench furnished with each drill.

Connecting Air Hose to Tool

1. Always blow out the air hose before connecting it.
2. Blow off end of No. 66 reducer to free any small particles of dirt, scale or any other foreign matter lodged inside of end.
3. Check air strainer to be sure it is clean.
Note: A large percentage of repairs to pneumatic tools are due to water, dirt and scale entering the tool from the hose and pipe lines. **KEEP THEM CLEAN.**

Operation of the Wood Boring Drill

1. Grasp the No. 65 throttle sleeve with one hand and the No. 412 grip handle with the other hand.
2. Place the point of the auger at the position which is to be the center of the hole to be bored.
3. Open the throttle gradually by turning the No. 65 throttle sleeve counter-clockwise.
4. Exert effort against the tendency of the machine to rotate.
5. Continue turning the No. 65 throttle sleeve to the wide open position as the auger enters the wood.
6. Should the auger become stuck in a particularly hard spot, reverse the rotation of the drill to back out the auger from the wood. (See following instructions for control of twist throttle for forward and reverse operation.)
7. TWIST THROTTLE CONTROL - The operation of the drill is controlled by a reversible twist throttle, actuated by twisting the No. 65 throttle sleeve with No. 169 rubber cover to the right and left. This throttle control enables the operator to start and stop the drill, control its speed and direction of rotation. With adjustments, the throttle may be LOCKED for right-hand auger rotation only, or UNLOCKED for intermittent right and left hand auger rotation.
 - A. To lock the twist throttle FOR RIGHT HAND AUGER ROTATION ONLY.

- (1) Rotate the No. 65 throttle sleeve to the left as far as possible.
 - (2) Push No. 81 lock sleeve forward to its most inner position. (When the throttle sleeve is so locked, the sleeve's movement is 45° between the furthermost counter-clockwise and the furthermost clockwise position. See Illustration No. 1.)
- B. TO ADJUST HANDLE FOR REVERSE RUNNING POSITION.
- (1) Slide No. 81 lock sleeve to its most outward position.
 - (a) In this position the furthermost clockwise location of the throttle sleeve is the wide open REVERSE running position;
 - (b) The furthermost counter-clockwise location is the wide open FORWARD position.

C. Midway between these two points is the "off" position.

2

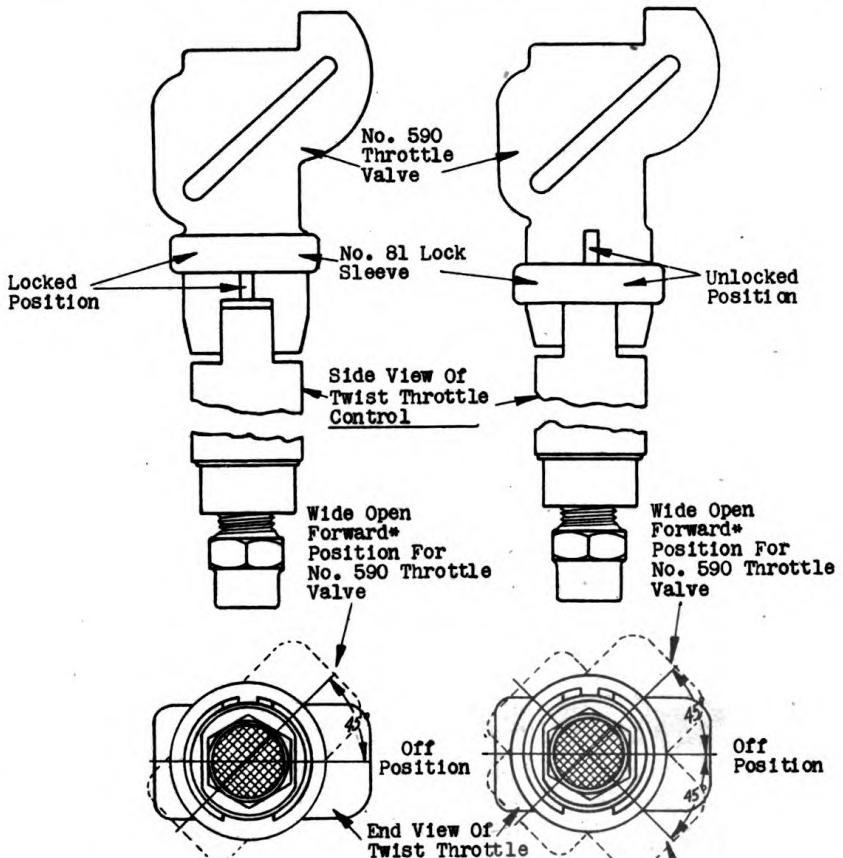


Figure 1

LOCKED

*Forward - Means Right Hand Auger Rotation

*Reverse - Means Left Hand Auger Rotation

Figure 2

UNLOCKED

Wide Open Reverse* Position For No. 590 Throttle Valve

Illustration No. 1 Original from

UNIVERSITY OF CALIFORNIA

8. When two men operate the machine, the second man, or "helper" grasps No. 73 dead handle to aid in holding against the tendency of the machine to rotate.
9. Never tilt the auger from the direction in which the hole is being bored.

FIELD SERVICE OPERATIONS

The following minor servicing jobs should be done in the field occasionally by the machine operator to insure the most proficient performance of the drill and prevent unnecessary wear or breakage caused by neglect of the machine.

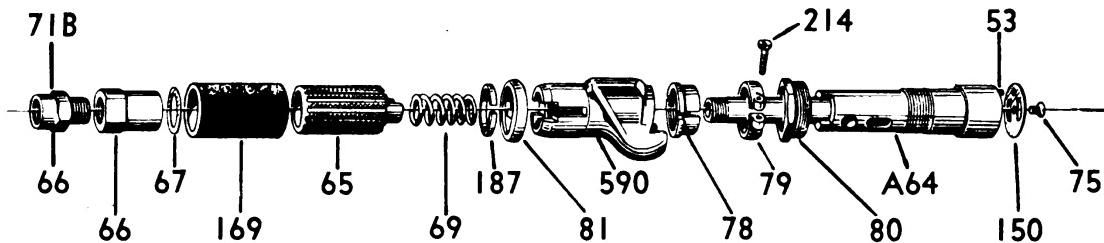
Check No. 914 and No. 915 Clamp Screws

1. After each 48 hours of actual operation, test the eight No. 914 and No. 915 clamp screws on the four connecting rods for tightness. (See exploded view, Page VI)
2. Test with a screw driver. (Vibration may cause these screws to work loose.)
3. Check all other external screws and nuts for tightness.

Servicing of Twist Throttle Control

1. Should the throttle stick, check for corrosion at the tapered seat between the No. 590 valve and the No. A64 throttle stem. (See Illustration No. 2, Below).
2. Apply OE-10 oil through open exhaust bell on the No. 590 valve to soak and lubricate rusty sections on the tapered seat.
3. Should throttle continue to stick, disassembly is necessary.

A142 Throttle (See Note 10)



Descriptions to Accompany Numbers are on Page VII

Illustration No. 2

To Disassemble Twist Throttle (See Illustration No. 2, Page 4)

- (a) Unscrew No. 80 throttle clamp nut in a counter-clockwise direction.
- (b) Wedge a cloth plug into the twist throttle control opening to prevent dirt entering motor parts.
- (c) Remove No. 66 throttle cap nut, No. 65 throttle sleeve, No. 69 tension spring, No. 81 lock sleeve from the No. A64 throttle stem.
- (d) Tap lightly against the exhaust end of the No. 590 valve in an outward direction from the machine.
- (e) Pull No. 590 valve outward from its tapered seat.
- (f) Inspect tapered seat in No. 590 valve and its corresponding seat on No. A64 throttle stem. (If corroded or rusty sections are present, wipe the No. 590 valve on the No. A64 stem with clean oil until free. Do not use emery cloth or abrasive grit.)
- (g) Wash parts thoroughly in gasoline.
- (h) Lubricate parts with OE-10 oil.

To Reassemble Twist Throttle Parts

- (a) Rotate No. 590 valve on its seat to right and left until free movement has been restored.
(When reassembling be sure No. 67 throttle cap nut washer is in place between No. A64 throttle sleeve and No. 66 throttle cap nut.)

4**Air Strainer**

1. Remove No. 66 reducer from end of throttle handle.
2. Remove No. 71B air strainer from No. 66 reducer bushing.
3. Clean strainer thoroughly in gasoline.
4. Dry strainer with blasts of air.
5. Replace strainer and reducer to original positions.

5**FIELD LUBRICATION**

Proper and sufficient lubrication is the most important single factor in keeping performance of the No. 62 Wood Boring Machine at a maximum and repairs at a minimum. The following lubrication should be done every four hours.

Oil Lubrication

The correct grade of oil may be poured into the machine through either or both of two openings.

1. Through No. 66 reducer air inlet opening.

2. Or through the No. 7 oil plug opening. (Located to the left of the twist throttle handle.)

Note: In both cases the lubricant is carried to the internal motor valves and their operating parts by the compressed air.

- (a) Lubrication applied through the No. 66 reducer opening lubricates twist throttle parts as well as the internal motor parts.
- (b) Lubrication applied through the No. 7 oil plug opening lubricates only internal motor parts. This method does not require disconnection of the air hose from the drill.

Grease Lubrication

A high pressure grease nipple (No. 1297), painted RED, located immediately above the dead handle supplies lubrication to the pistons, piston rod bearings, crank bearings, eccentric, gears and spindle bearings.

1. Apply a light cup grease through the No. 1297 grease nipple.
2. Apply grease every four hours.
3. Avoid filling cylinder or gear case more than one-third full.

LUBRICATION SPECIFICATIONS

	Temperatures	U.S. Army Symbol
Oil	32° F. and below above 32° F.	OE-10 (oil, engine, S.A.E. 10) OE-30 (oil, engine, S.A.E. 30)
Grease	32° F. and below Above 32° F.	Equal Mix. of GP-No. 1 Grease and OE-10 oil GP-No. 1 Grease

Always use clean oil. Under no circumstances should old crank case oil be employed.

Oil or grease which has been standing in an open container collecting dust and dirt should not be used.

EXTREME WEATHER CONDITIONS**Hot Weather Operation**

The No. 62 Wood Boring Machine will operate in extreme high temperatures without adjustments.

1. Lubrication - particular care should be given that proper grade lubricant is used.
2. Check lubrication frequently.
3. Keep parts clean.
4. Air strainer - check frequently to insure against accumulation of dust and dirt.

Cold Weather Operation

1. Follow all ordinary service operations.
2. Grease Lubricant.
 - (a) For temperatures below 32° F. use an equal mixture of a GP-No. 1 cup grease and OE-10 machine oil.
 - (1) Remove one of the No. 84 crank chamber plates.
 - (2) Add the mixture after every four hours of operation.

PREPARING WOOD BORING DRILL FOR STORAGE

When the drill is not to be used for a period of time, it should be stored in a dry and protected place. The following procedure should be followed when the unit is placed in storage.

1. Insert liberal amounts of OE-10 oil into the No. 66 air inlet reducer opening and the No. 7 oil plug opening.
2. Connect the air hose and operate the drill slowly to flush the lubricant into the motor valves and other internal parts.
3. Plug the No. 66 air inlet opening.
4. Plug the exhaust opening on the twist throttle handle.
5. Use cloth plugs to prevent entry of dust, dirt or moisture when in storage.

MEMORANDA

INDEX TO MAINTENANCE INSTRUCTIONS

	PAGE
SUMMARY OF SERVICING OPERATIONS	9
GENERAL INFORMATION	9
MAJOR UNIT IDENTIFICATION	9
TWIST THROTTLE CONTROL UNIT	12
Disassembling of Unit	
Reassembling Throttle Handle	
Throttle Valve Repair and Adjustment	
Stopping Air Leakages	
Lapping Valve	
MOTOR UNIT	14
Grip Handle Parts	
Dead Handle Parts	
Motor Unit Inspection	
MOTOR UNIT SERVICING	15
Removing Corliss Valves	
Designation of Right and Left Valve Parts	
Servicing Corliss Valves and Bushings	
Lapping Valves and Bushings	
Reassembling Valve Parts	
Inspection and Replacement of Eccentric Straps and Eccentric	
Servicing Connecting Rods and Pistons	
Lapping Connecting Rods and Pistons	
Reassembling Connecting Rods and Pistons	
Inspection of Rollers and Retainer	
Inspection of Crank Pinion and Gear Wheel	
Inspection of Spindle Bushing	
GEAR CASE UNIT	26
Removing Spindle Assembly	
No. 18 Gear Wheel	
Spindle Packing	
Inspection of Rollers and Retainer in Gear Case	
LUBRICATION FOR FINAL SERVICING OPERATIONS	28
Grease Application	
Oil Application	
Lubrication Specifications	

SUMMARY OF SERVICING OPERATIONS

Proper and complete maintenance and servicing of the No. 62 Wood Boring Drill requires thorough inspection, cleansing and lubrication of each and every part at least once every 2048 hours. If the drill is used continuously, the servicing job should be done more frequently.

1. To accomplish the above procedure, each unit assembly should be disassembled into its component parts. (A unit assembly is a group of parts assembled together to perform a definite function in the operation of the machine.)
 - (a) Thoroughly inspect each part for worn bearing surface as well as for corroded sections.
 - (b) If the part is badly worn and beyond repair, it should be replaced.
 - (c) Assembly of new parts in conjunction with badly worn parts may cause rapid failure of both parts.
2. (a) Thoroughly clean each part in a dirt and grease cutting solvent such as gasoline.
(b) Lubricate the separate parts with OE-10 oil.
(c) Reassemble parts to complete the unit assembly.
3. All unit assemblies, each having been properly serviced, may then be assembled together to complete the final assembly of the No. 62 Wood Boring Drill.

GENERAL INFORMATION

When reading the following instructions, refer to the exploded views as well as to the cross sectional drawings of the assembled tool for further information regarding the appearance or design of each part and its relationship with the parts adjacent to it.

Identification of Major Units

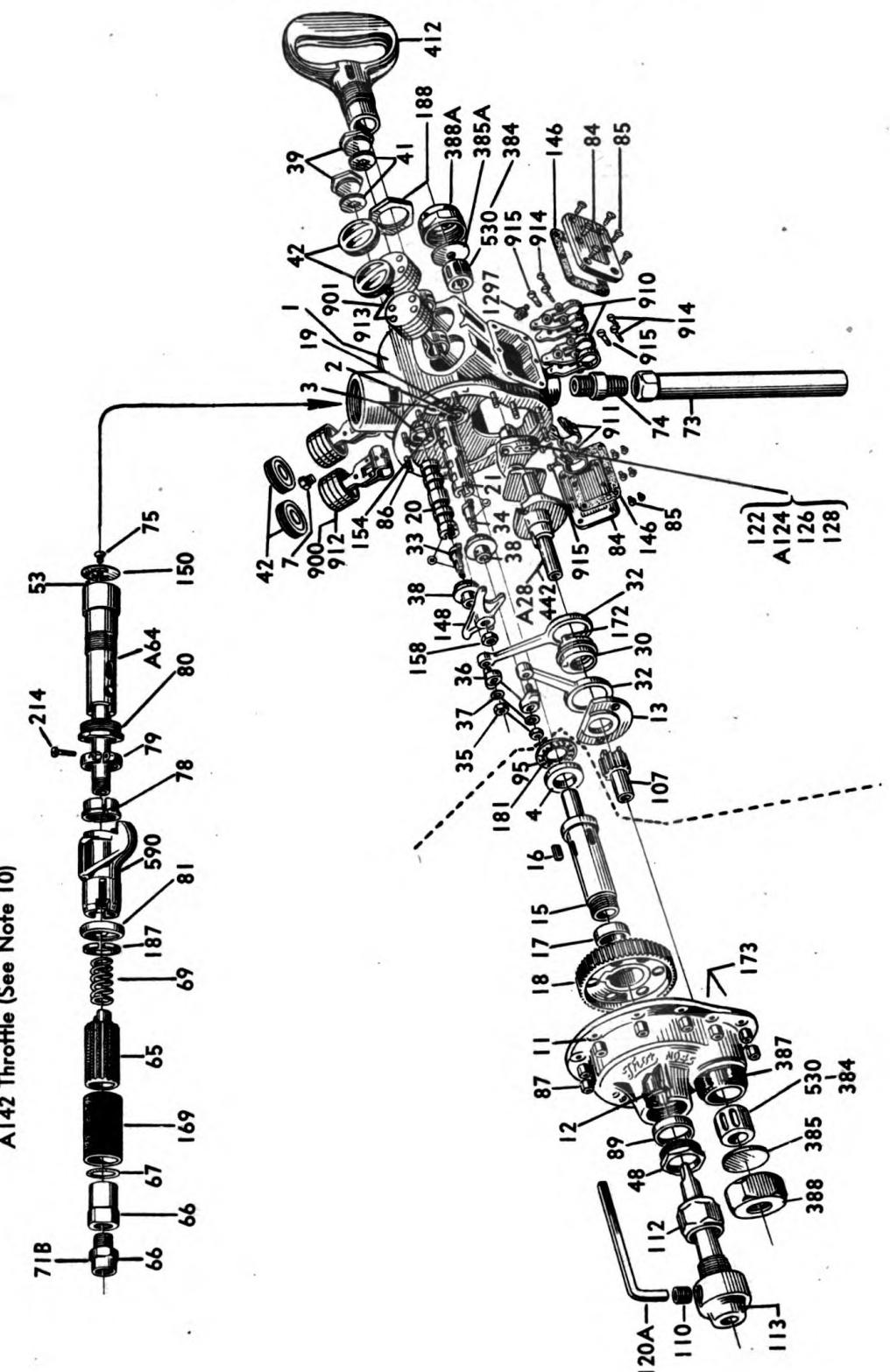
The Thor No. 62 Wood Boring Drill may be divided into three major unit assemblies or part groups:

- (a) Twist Throttle Control Unit - consists of all parts pertaining to operation of the throttle.
- (b) Motor Unit - consists of grip handle and dead handle, cylinder, two Corliss valves, four connecting rods and pistons, crank and all other parts which assemble to complete the motor unit.
- (c) Gear Case Unit - consists of spindle and gear as well as other parts assembled in the gear case.

These classifications are based on the manner in which the servicing operations should proceed. Disassembling and reassembling operations as well as the necessary servicing instructions pertaining to each major unit as described herein.

EXPLODED VIEW OF COMPLETE TOOL

Numbers indicated on this page are only base numbers. For complete part number including required prefixes, and one noun description, see page 11.



**COMPLETE PARTS NUMBERS AND ONE NOUN DESCRIPTIONS FOR ITEMS
SHOWN IN EXPLODED VIEW ON PAGE 10**

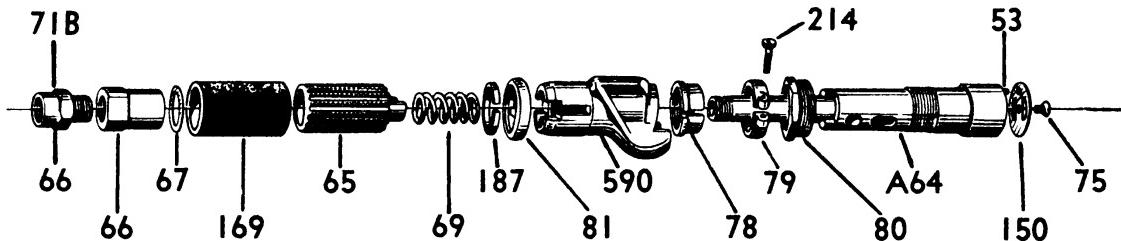
Part No.	Description	Part No.	Description
PD-12-1	Cylinder (See Note 1)	PD-2-86	Stud
PD-2-2	Bushing	PD-2-87	Nut
PD-2-3	Bushing	PD-2-89	Packing
PD-2-4	Race	PD-1-95	Retainer
PD-12-7	Plug	PD-6-107	Pinion
PD-2-11	Case (See Note 2)	PD-00-110	Screw
PD-2-13	Plate	PD-62-112	Nut
PD-2-15	Spindle (See Note 3)	PD-62-113	Chuck (See Note 6)
PD-2-16	Key	PD-6-120A	Wrench
PD-2-17	Collar	PD-2-122	Spring
PD-62-18	Gear	PD-2-A124	Mouthpiece
PD-2-19	Race	PD-2-126	Packing
PD-12-20	Valve	PD-2-128	Rivet
PD-12-21	Valve	PD-12-A142	Throttle (See Note 7)
PD-62-A28	Crank (See Note 4)	PD-2-146	Gasket
PD-2-30	Eccentric	PD-2-148	Clamp
PD-2-32	Strap	PD-12-150	Gasket
PD-2-33	Stud	PD-2-154	Stud
PD-2-34	Stud	PD-2-158	Nut
PD-2-35	Nut	PD-BW-169	Sleeve
PD-2-36	Lever	PD-2-172	Pin
PD-2-37	Washer	PD-2-173	Key
PD-2-38	Guide	PD-1-181	Ball
PD-12-39	Cap	PD-12-187	Spring
PD-2-41	Plate	PD-12-188	Nut
PD-2-42	Head	DC-2-214	Screw
PD-2-48	Box	PD-2-384	Roller
PCH-A-53	Pin	PD-2-385	Plate
PD-12-A64	Stem	PD-2-385A	Plate
PD-12-65	Sleeve	PD-2-387	Bushing
PD-12-66	Nut	PD-2-388	Cap
PR-260-66	Bushing (See Note 5)	PD-2-388A	Cap
PD-CC-67	Washer	PD-62-412	Handle
PD-12-69	Spring	PD-62-442	Shaft
PD-0-71B	Strainer	PD-2-530	Bearing (See Note 8)
PD-2-73	Handle	PD-12-590	Valve
PD-2-74	Plug	PD-2-900	Rod and Piston (See Note 9)
PD-00-75	Screw	PD-2-901	Rod and Piston (See Note 10)
PD-12-78	Nut	PD-2-910	Clamp
PD-12-79	Clamp	PD-2-911	Clamp
PD-12-80	Nut	PD-2-912	Rod and Piston
PD-12-81	Sleeve	PD-2-913	Rod and Piston
PD-2-84	Plate	PD-2-914	Screw
PD-2-85	Screw	PD-2-915	Screw
		ACK-1297	Nipple

NOTES

- Note 1 - Includes Nos. 2 Bushing, 3 Bushing, 19 Race, 86 Studs, 154 Stud.
- Note 2 - Includes Nos. 12 Bushing, 173 Key.
- Note 3 - Includes Nos. 4 Race, 16 Key, 17 Collar.
- Note 4 - Consists of Nos. 107 Pinion, 122 Spring, 124 Mouthpiece, 126 Packing, 128 Rivets, 442 Shaft.
- Note 5 - Includes No. 71B Strainer.
- Note 6 - Includes No. 110 Screw.
- Note 7 - Consists of Nos. A64 Stem, 65 Sleeve, 12-66 Nut, 67 Washer, 69 Spring, 75 Screw, 78 Nut, 79 Clamp, 80 Nut, 81 Sleeve, 150 Gasket, 169 Sleeve, 187 Spring, 214 Screw, 590 Valve.
- Note 8 - Includes No. 384 Rollers.
- Note 9 - Consists of Nos. 910 Clamp, 912 Rod and Piston, 914 Screws, 915 Screw.
- Note 10 - Consists of Nos. 911 Clamp, 913 Rod and Piston, 915 Screw.

**TWIST THROTTLE CONTROL UNIT
(See Illustration No. 3 below)**

A142 Throttle (See Note 10)



Descriptions to Accompany Numbers are on Page 11

Illustration No. 3

Disassembling of Unit

1. Unscrew No. 80 throttle clamp nut in a counter-clockwise direction.
2. Pull entire twist throttle handle from #1 cylinder.
3. Wedge a cloth plug into the twist throttle control opening to prevent dust and dirt entering.
4. Inspect the No. 150 gasket located between the end of No. A64 throttle stem and No. 1 cylinder. (Replace No. 150 gasket if it is damaged to cause imperfect seating.)

Reassembling Twist Throttle Handle

1. Be sure the No. 53 throttle dowel pin is lined up with the dowel pin hole in the No. 1 cylinder when drawing up the No. 80 throttle clamp nut. (A milled slot in the cylinder at this point locates the twist throttle handle in relation to the No. 1 cylinder assembly.)

Throttle Valve Repair and Adjustment

After long hours of service or if the drill has been operated under abrasive air conditions, air leakages may occur at the tapered seat between the No. 590 valve and the No. A64 valve stem.

- (a) The No. 78 stop nut (located on the No. A64 valve stem) must be adjusted so that the No. 590 valve taper and No. A64 valve stem taper are matched to make the air seal.

- (b) The No. 65 throttle sleeve must be free to rotate easily to the left and right.
(The No. 78 stop nut must be adjusted to a more inward position on the No. A64 valve stem if the seat should become worn or corroded.)

12

TWO METHODS TO STOP AIR LEAKAGES AT TWIST THROTTLE CONTROL

Two methods may be used to stop leakages at the twist throttle control. The first method should be used when the seat is but slightly corroded with rust.

First Method of Stopping Air Leakages

- (a) Insert liberal amounts of OE-10 oil into the exhaust bell opening of No. 590 valve.
- (b) Work the No. 590 valve to the right and left to distribute the oil.
- (c) Loosen the No. 214 stop nut clamp screw located in the No. 79 stop nut clamp.
- (d) Screw the No. 78 stop nut away from the No. 590 valve, (towards the machine in a clockwise direction).
- (e) Connect the air hose to the twist throttle handle.
- (f) Rotate the No. 590 valve to the left and right until the air leakages are subdued.
- (g) The No. 590 valve adjusts itself to a more inward position on the No. A64 valve stem.
- (h) Adjust the No. 78 stop nut against the No. 590 valve.
- (i) Tighten the No. 214 stop nut clamp screw securely.

Second Method of Stopping Air Leakages

In case the tapered seat in the valve is so worn and out of shape that the above method of adjustment fails to remedy the condition, a second method which consists of a lapping or fitting operation must be employed:

Lapping No. 590 Valve against No. A64 Valve Stem Seat

- (a) Prepare lapping compound by mixing a small amount of fine emery (No. 120) with lard oil or OE-30 oil.
- (b) Remove the air hose from the reducer and disassemble the handle as shown in illustration No. 3.
- (c) Apply lapping compound to the taper of the No. A64 valve stem.
- (d) Slide the No. 590 valve over seat.
- (e) Lap by rotating alternately to the right and left until a seal has been obtained.
- (f) Adjust the No. 78 stop nut against the No. 590 valve as described in the first method above.
- (g) Remove the No. 590 valve from the No. A64 valve stem.
- (h) Wash the parts thoroughly in gasoline.
- (i) Lubricate all parts with OE-10 oil before reassembling.
- (j) If necessary to obtain proper seat, again adjust No. 78 stop nut.
- (k) Be sure to assemble the No. 67 throttle cap nut washer between the No. A64 throttle sleeve and No. 66 throttle cap nut.

MOTOR UNIT

Grip Handle Parts

The grip handle unit, consisting of the No. 412 grip handle and No. 188 grip handle check nut, may be unscrewed from the top of the No. 1 cylinder in a left hand direction after loosening the No. 188 grip hand check nut. (See Illustration No. 4 below.)

Dead Handle Parts

The dead handle unit, consisting of No. 73 dead handle and the No. 74 dead handle plug, may be removed by unscrewing the dead handle unit from the No. 1 cylinder in a left hand rotation. Disassemble the No. 74 plug from the No. 73 dead handle (see illustration No. 4 below) and remove any grease which might have worked into the center of these parts from the crank chamber in the No. 1 cylinder.

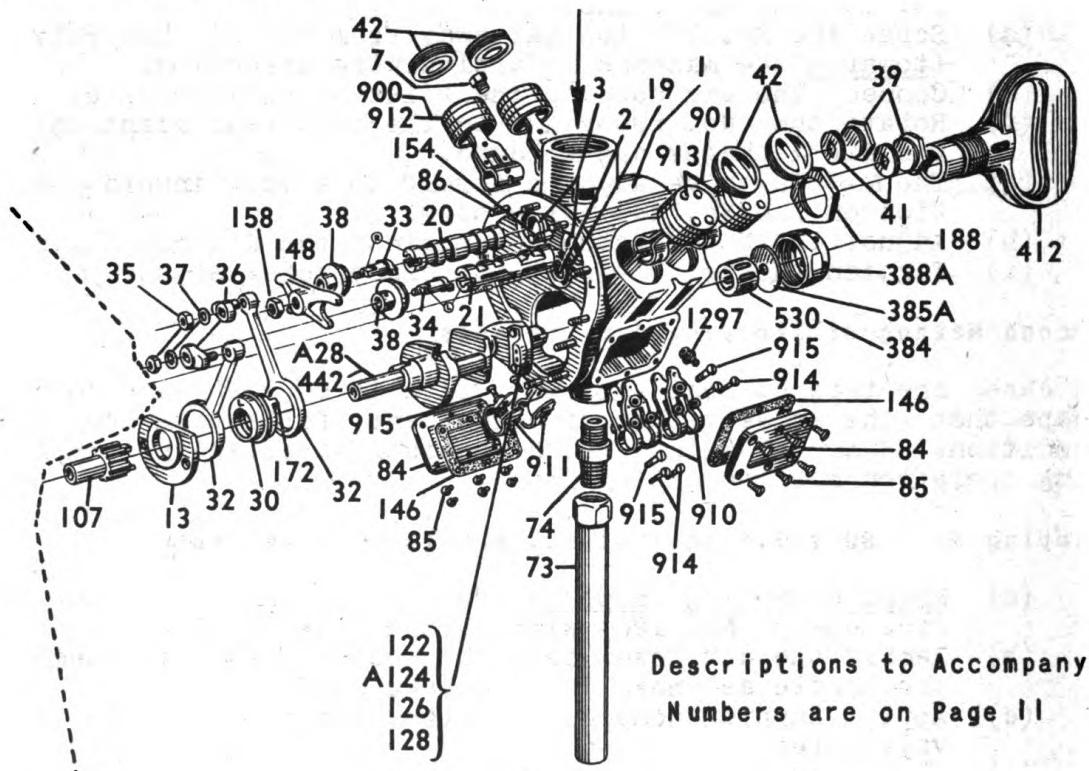


Illustration No. 4
Entire Motor Unit

Motor Unit Parts - Inspection Procedure (See Illustration No. 4, above)

1. Loosen the No. 48 stuffing box unscrewing it in a clockwise direction (LEFT HAND THREAD). (This is to relieve any possible binding of the No. 15 spindle by the No. 89 packing for spindle.)

Original from

UNIVERSITY OF CALIFORNIA

2. Remove both No. 84 crank chamber plates by unscrewing the six No. 85 crank chamber plate screws in each No. 84 crank chamber plate.
3. Remove the four No. 42 cylinder heads by unscrewing them in a counter-clockwise direction.
4. At this point the motor parts are fairly well exposed and may be inspected by working the motor parts by hand through several complete cycles. If the motor unit can be worked through 4 or 5 complete cycles with no apparent signs of binding or sticking, the motor is in good shape and should not be disassembled.
5. If disassembly is not required, submerge the entire motor unit in gasoline and remove all old grease. 14
6. Lubricate all parts with OE-10 oil.
7. Set aside in a clean dry place until ready for reassembly. 15

Note: If the motor parts stick or bind, the parts should be immediately serviced. The binding action may take place between the No. 20 and No. 21 valves and the No. 3 valve bushings, or between the No. 900 and No. 901 inside and outside connecting rod and piston assemblies and their respective cylinder bores.

MOTOR UNIT SERVICING OPERATIONS

Nos. 20 and 21 Right and Left Valves

The Nos. 20 and 21 right and left valves are Corliss Valves, which are self seating. When the valve bushings become worn, the air behind the valve tends to hold it against its seat, thereby following up its own wear in the No. 3 valve bushings. The Nos. 20 and 21 valves are operated synchronously with the four No. 900 and No. 901 piston rod assemblies by two No. 32 eccentric straps which are directly connected to a No. 30 eccentric located on the No. A28 crank assembly.

To Remove Nos. 20 and 21 Corliss Valves and Adjacent Parts

1. Remove the two No. 39 exhaust caps located at top end of the No. 1 cylinder assembly.
2. Unscrew the two No. 41 valve end plates located just below the No. 39 caps by using a 11/32" square end wrench.
3. Pull the No. 20 and 21 valves out of the No. 3 bushings. (Use a threaded rod (13/32" x 26 R.H. Thr.) screwed into the upper end of the Corliss Valves, as shown in illustration No. 7.)
4. Turn the machine over so that the No. 11 gear case assembly points upward.

5. Unscrew the twelve No. 87 gear case stud nuts.
6. Carefully pry the No. 11 gear case assembly off the No. 1 cylinder assembly.
7. The No. 15 spindle assembly may be removed along with the No. 11 gear case assembly.
8. Unscrew the No. 158 valve guide clamp nut.
9. Lift the No. 148 valve guide clamp off No. 154 valve guide clamp stud.
10. Remove the two No. 35 valve stud nuts and No. 37 valve stud washers.
11. Carefully pry the two No. 36 valve levers off the two No. 33 and 34 right and left valve studs.
12. Slide the No. 30 eccentric off the No. A28 crank assembly. (At the same time, remove the two No. 32 eccentric straps).
13. Place a small rod through the upper end of the No. 3 valve bushing and tap it lightly against the inside surface of the No. 38 valve stud guide to drive the No. 38 guide out of the No. 1 cylinder assembly.
14. Clean all parts thoroughly in gasoline.

Designation of Right and Left Corliss Valve Parts

Before proceeding with servicing operations for the Corliss Valve parts, study Illustration No. 5, Page 17, showing the correct placement of the right and left valve parts in the No. 1 cylinder assembly.

The parts should always be repaired and reassembled in this order. Note that only two sets of corresponding parts are marked "R" for right and "L" for left parts. Also note that the No. 1 cylinder is marked for right and left sides as is the No. 30 eccentric, located on the No. A28 crank assembly. The correct assembly of the parts as well as methods of determining right and left parts are shown in Illustration No. 6 on page 18.

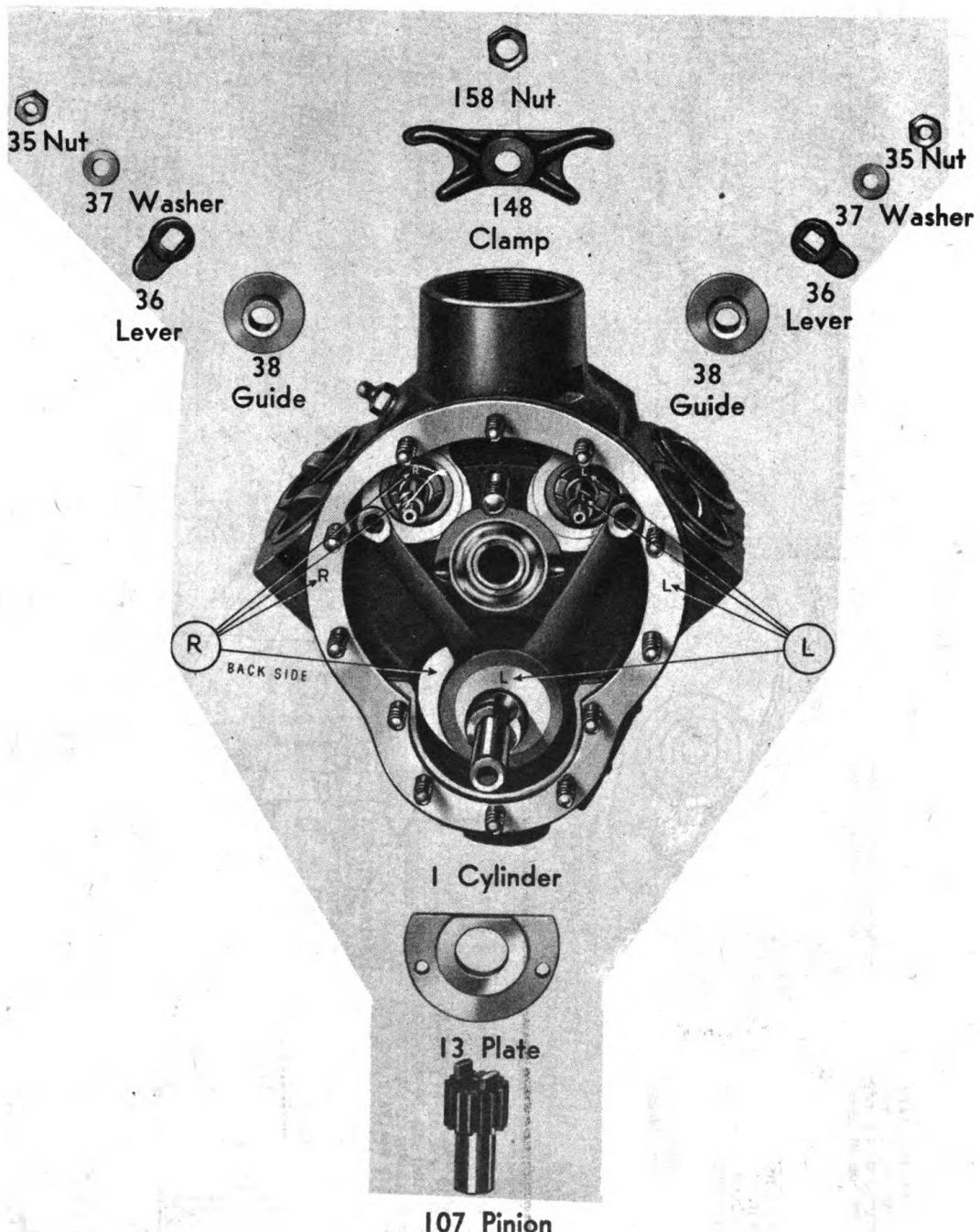


Illustration No. 5

MAINTENANCE INSTRUCTIONS

TOP VIEW OF NO. 33 AND NO. 34 VALVE STUDS

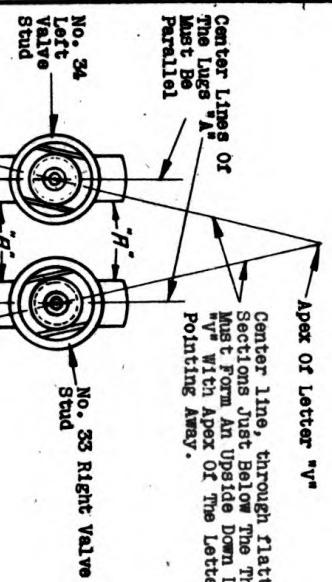


FIGURE 1

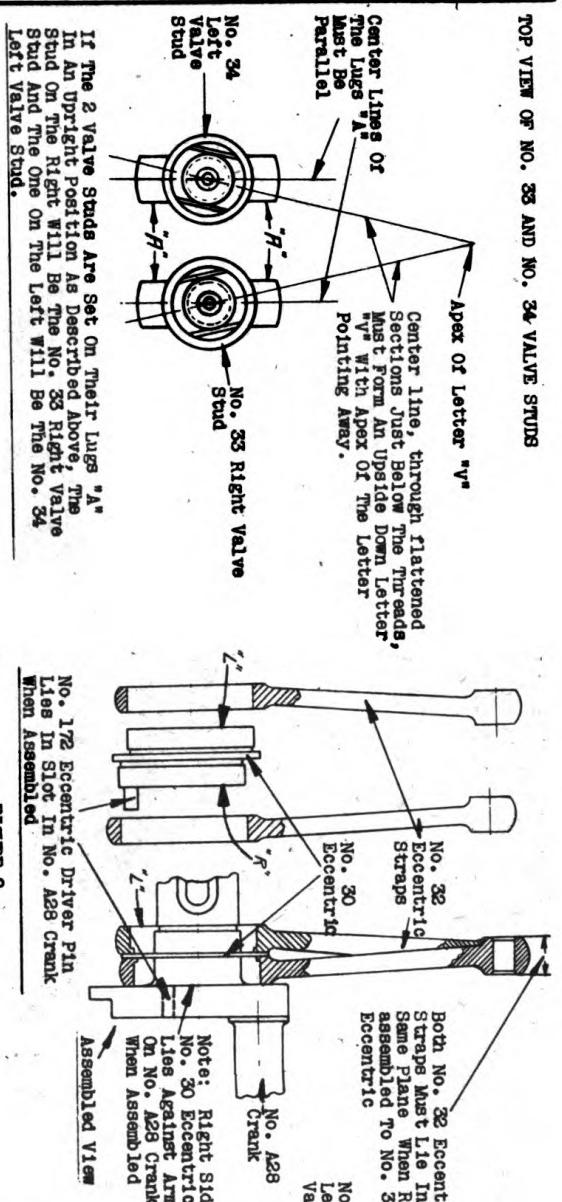


FIGURE 2

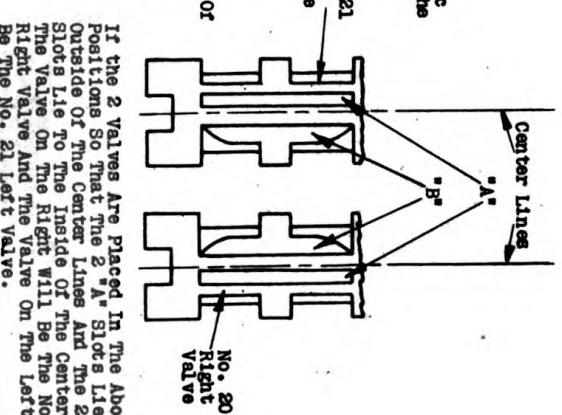


FIGURE 3

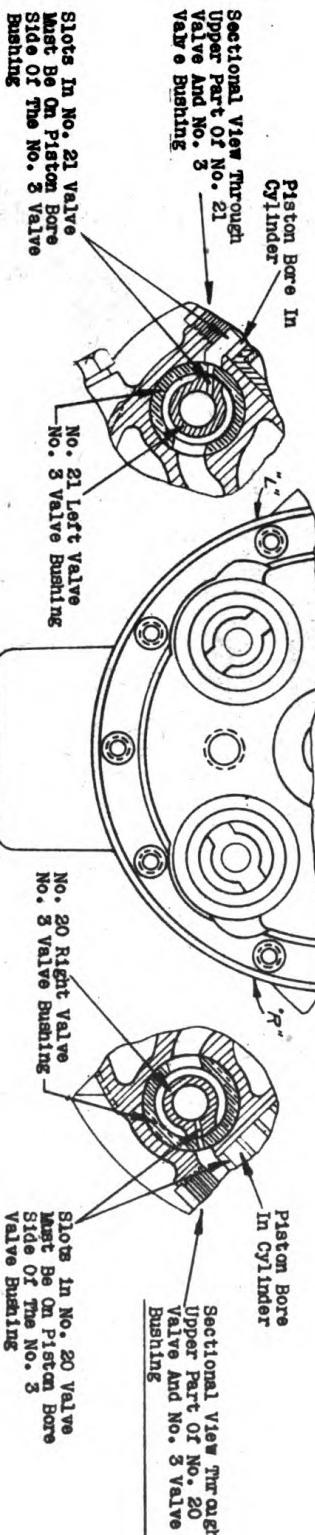


FIGURE 4

Illustration No. 6

Servicing Instructions For Nos. 20 and 21 Corliss Valves and No. 3 Valve Bushings

1. If the inside surface of the No. 3 valve bushing or the outside surface of the No. 20 or 21 valve is slightly corroded or scored, lubricate the No. 20 or 21 valve with OE-10 oil and then insert it into its corresponding right or left No. 3 bushing in its correct position as shown in Figure 4, Illustration No. 6.
2. Rotate the No. 20 or 21 valve slightly to the right and left to determine whether it is free.
3. If sticking or binding is not apparent, the No. 20 or 21 valve may be considered in good shape.
4. However, if the No. 20 or 21 valve tends to stick, a lapping operation must be done.

Lapping Nos. 20 and 21 Valves in No. 3 Valve Bushing

1. Screw a lapping rod (as shown in Illustration No. 7 below) into the upper end of the No. 20 or 21 valve.

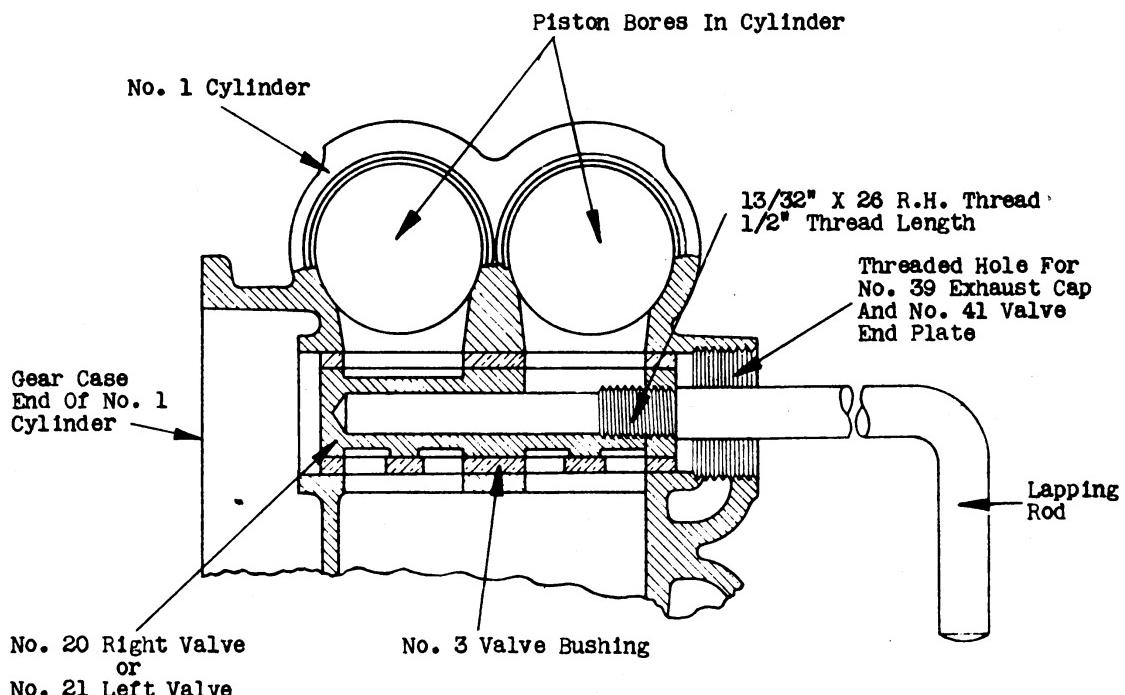


Illustration No. 7

2. Apply a small amount of lapping compound (See Preparation of Lapping Compound, Page 13) to the No. 20 or 21 valve.
3. Insert the valve into its correct position in the No. 3 right or left valve bushing. (See Figure 4, Illustration No. 6, for correct location of No. 20 or 21 valve in No. 3 bushing.)

Original from

UNIVERSITY OF CALIFORNIA

4. Rotate the No. 20 or 21 valves slightly to the left and right from five to ten times.
5. Remove the No. 20 or 21 valve from the No. 3 bushing and clean thoroughly in gasoline.
6. Lubricate the No. 20 or 21 valve with OE-10 oil.
7. Insert it into the No. 3 right or left bushing and rotate slightly as before to the right and left to determine its freeness. (The lapping operation should be performed until the No. 20 or 21 valve rotates freely in its corresponding No. 3 right or left valve bushing.)
8. Lightly lubricate each No. 20 and 21 valve with OE-10 oil and place in a dry, clean place until ready for final assembly.

Reassembling Valve Parts

When reassembling, always reassemble the valve parts as per Illustrations No. 5 and 6. There is only one correct position for the right and left valve parts. Those valve parts which are not designated by the "R" or "L" stamped letters are interchangeable with each other and therefore may be assembled interchangeably.

Timing of the Machine

The timing of the machine is in setting the No. 3 valve bushings that are pressed into the No. 1 cylinder assembly. The No. 3 valve bushings should never be tampered with under any circumstances, for it requires special equipment and timing device to accurately set them in their correct positions in the No. 1 cylinder assembly.

Inspection and Replacement of No. 32 Eccentric Straps and No. 30 Eccentric

1. Inspect the two No. 32 eccentric straps. Replace if the large diameter end of the strap is worn out of round or if it fits very loose on the No. 30 eccentric.
2. Inspect the No. 30 eccentric. If considerably worn along its eccentric strap bearing surface, it should be replaced. (As a general rule, if the No. 30 eccentric is replaced, the No. 32 eccentric straps are also replaced.)

Refer to Illustration No. 6, Figure 2, which shows a disassembled view and assembled view of the two No. 32 eccentric straps and the No. 30 eccentric. Right side of the No. 30 eccentric, on which is mounted the No. 172 eccentric driver pin, lies next to the arm on the No. A28 crank assembly. Note that the two No. 32 eccentric straps should always be assembled to the No. 30 eccentric so that the valve lever ends of the No. 32 eccentric straps lie in the same place.

Original from

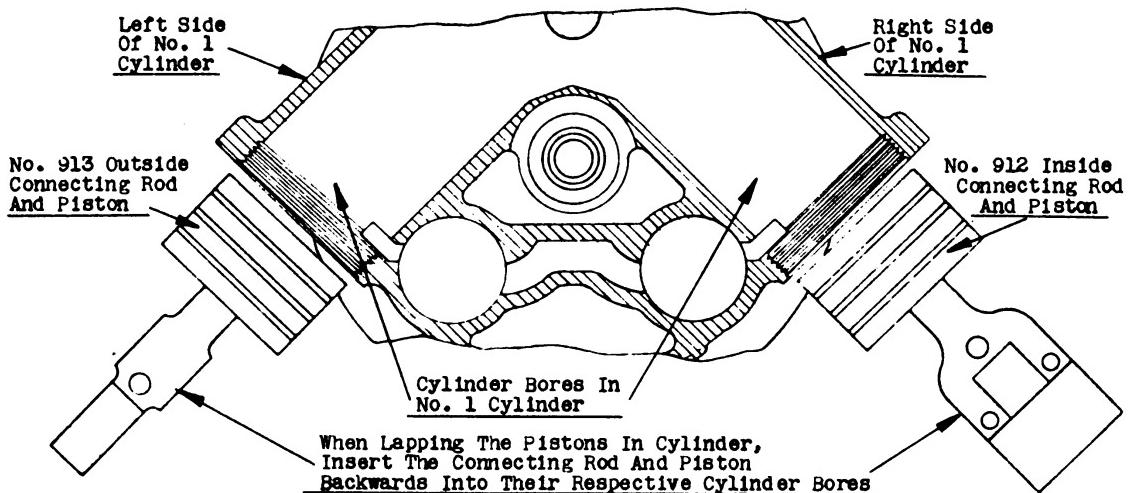
UNIVERSITY OF CALIFORNIA

Servicing Instructions for Nos. 900 Inside and No. 901 Outside Connecting Rods and Pistons

The small No. 933 expander wrench, furnished with each drill, and an ordinary screw driver are the only tools required for the disassembly of the two No. 900 inside and No. 901 outside connecting rods and pistons from the No. A28 crank assembly. (Refer to Illustration No. 8 (Pages 22 and 23) showing the steps involved. Note that the No. 901 outside connecting rod and pistons are always removed first and reassembled last.)

Lapping Instructions for No. 912 Inside and No. 913 Outside Connecting Rods and Pistons

1. To determine whether lapping of No. 912 inside and No. 913 outside connecting rod and pistons is absolutely necessary, apply a liberal amount of OE-10 oil to the piston and insert it backwards into its cylinder bore. (See Illustration No. 9 below).



**Illustration No. 9
View from Gear Case End of No. 1 Cylinder**

2. Work the connecting rod and piston back and forth in a rotating motion to determine whether it has a free oscillating motion. If no signs of sticking or binding are present, lapping is unnecessary.
3. If the connecting rod and piston sticks or binds, the lapping operation should be employed.
4. Apply a small amount of lapping compound (See Preparation of Lapping Compound, Page 13, bottom) to the piston and insert it backwards into its cylinder bore (See Illustration No. 9).
5. Work the piston back and forth in a rotating movement from 5 to 10 strokes. (Continued on page 24)

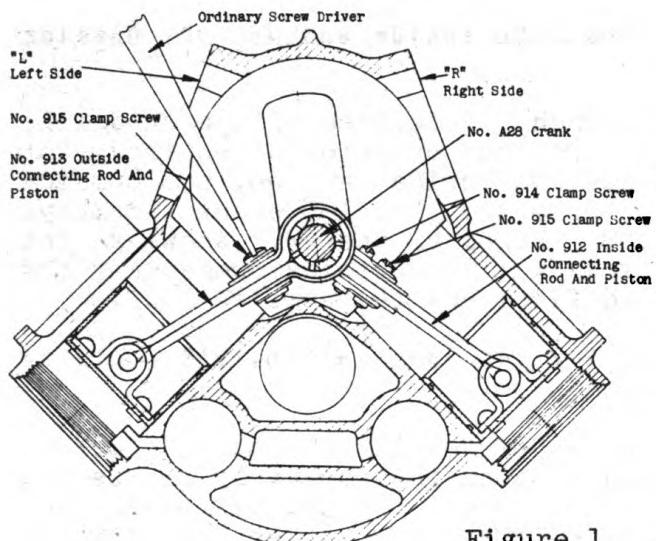


Figure 1

Unscrew and remove the No. 915 clamp screws from both No. 911 outside connecting rod clamps. The No. 915 clamp screws should always be assembled as shown in Figure 1.

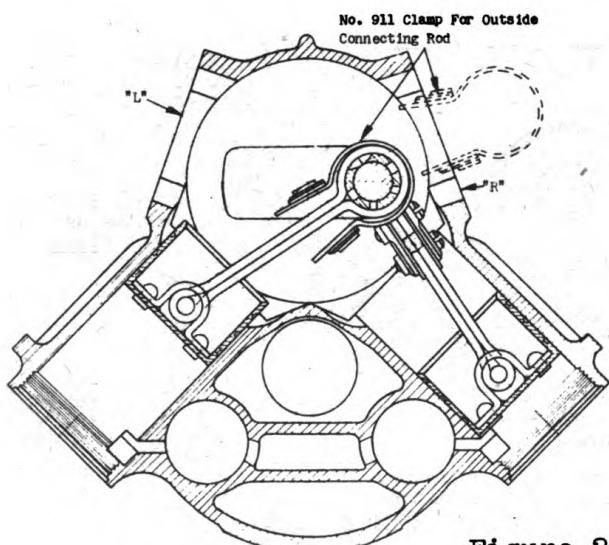


Figure 2

Push crank around to opposite crank chamber opening and pull the No. 911 outside connecting rod clamp off and out. (Figure 2)

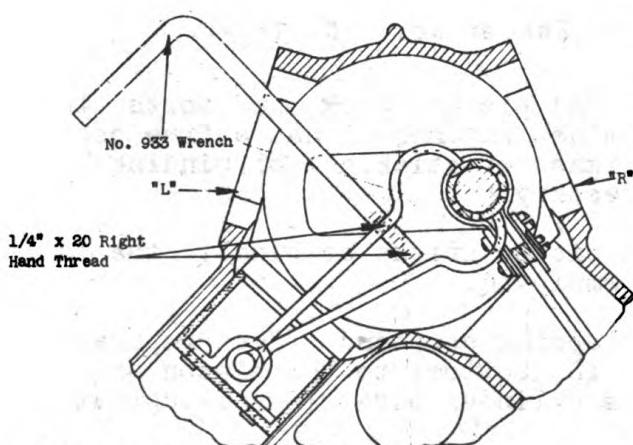


Figure 3

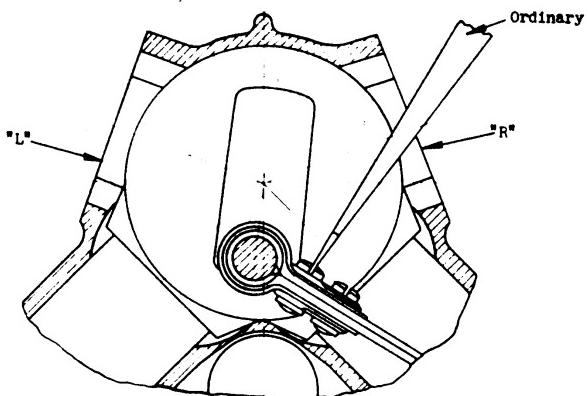
Screw the No. 933 wrench into the tapped hole in the connecting rod and spread the No. 913 outside connecting rod and pistons to pull them off the No. 900 inside connecting rods and pistons, located on the No. A28 crank. Remove the No. 933 wrench and work the No. 913 outside connecting rods and pistons out of their corresponding cylinder bores. (Figure 3)

Note: It is very important at this point to mark each No. 913 connecting rod and piston in some manner so that on reassembling, they will be placed in the same cylinder bores from which they were removed. It is suggested to insert the pistons backwards into their corresponding cylinder bores until ready to service them.

Illustration No. 8

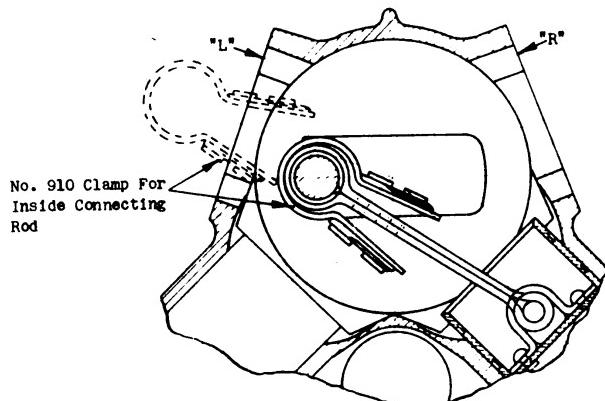
Original from

UNIVERSITY OF CALIFORNIA



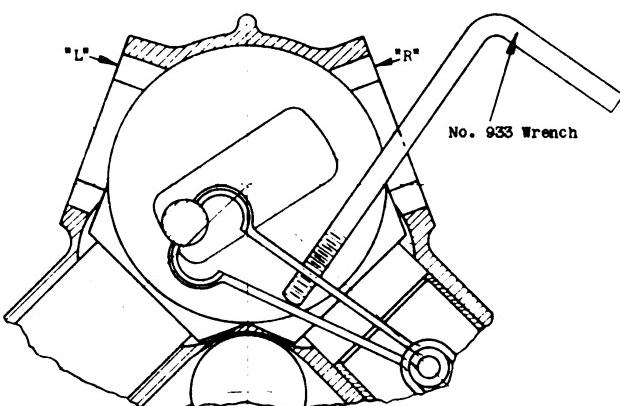
Unscrew and remove the two No. 914 clamp screws and the No. 915 clamp screw from both No. 910 inside connecting rod clamps.

Figure 4



Push the crank over to opposite crank chamber opening and pull the No. 910 inside connecting rod clamps off and out.

Figure 5



The No. 912 inside connecting rods and pistons are removed by spreading the connecting rod in the same manner as described under Figure 3.

At this point wash the entire No. 1 cylinder, No. 912 inside and No. 913 outside connecting rods and pistons in gasoline.

Figure 6

ILLUSTRATION NO. 8 CONTINUED

(Continued from page 21)

6. Remove the connecting rod and piston and thoroughly wash the piston and cylinder bore in gasoline.
7. Make another inspection as described previously to determine whether the piston should be further lapped. (The lapping operation should be employed until the connecting rod and piston has a free and smooth oscillating movement in its cylinder bore.)

To Assemble No. 900 Inside and No. 901 Outside Connecting Rods and Pistons to No. A28 Crank

(Before reassembling No. 900 inside and No. 901 outside connecting rods and pistons to No. A28 crank, see No. 530 rollers and retainers below).

Reassembling No. 900 inside and No. 901 outside connecting rods and pistons to the No. A28 crank is in reverse order to disassemble. Therefore, Figure 6, Illustration No. 8, will be the first operation.

Note that No. 912 inside connecting rods and pistons are always reassembled first to the No. A28 crank before reassembling the No. 913 outside connecting rods and pistons. Also make certain that the No. 910 and 911 connecting rod clamps are assembled to the No. 912 and 913 connecting rods and pistons respectively so that the No. 914 and 915 clamp screws are screwed into the No. 912 as shown in Figures 4 and 1, Illustration No. 8.

Inspection of No. 530 Rollers and Retainer in No. 1 Cylinder

The No. 530 roller and retainer which supports the upper end of the No. A28 crank may be removed after the removal of the No. A28 crank. The No. A28 crank assembly is pulled from its upper No. 530 bearing after the No. 912 inside and No. 913 outside connecting rods and pistons have been removed.

1. To remove the upper No. 530 bearing: (a) unscrew the No. 388A upper crank cap. (b) tap upper end of the No. 1 cylinder against a hard wood block to work the No. 530 bearing down and out.
2. Clean the No. 530 bearing thoroughly in gasoline.
3. Inspect each No. 384 roller. (The No. 384 rollers should rotate freely in their retainer at all times.)
4. A cracked or broken No. 384 roller should always be replaced. The replacement procedure is as follows:
 - (a) Lift the roller slot edges in the retainer up slightly to permit the passage of the No. 384 roller.
 - (b) after inserting the new No. 384 roller into its slot, carefully pein over or bend over the edges to retain the roller in the retainer.
 - (c) Eight No. 384 rollers are required in each bearing.

5. Insert the No. 530 bearing into its proper location in the No. 1 cylinder.
6. Apply a liberal amount of Proper grade cup grease to the No. 530 bearing. (See Grease Lubrication Page 28).
7. Replace the No. 385A upper crank bearing thrust plate and No. 388A upper crank cap.

Inspection of No. 107 Crank Pinion and No. 18 Gear Wheel

Mesh the No. 107 crank pinion with the No. 18 gear wheel on the No. 15 spindle. If there is considerable play between the gear teeth on the respective gears, both gears should be replaced.

Inspection of No. 2 Spindle Bushing

If the No. 2 spindle bushing is considerably worn, the grease lubricant from the No. 11 gear case will seep through between the inside bearing surface of the No. 2 spindle bushing and the outside bearing surface of the No. 15 spindle complete. If this condition occurs, the No. 2 spindle bushing should be replaced.

Since the No. 2 spindle bushing is a press fit in the No. 1 cylinder, the old No. 2 bushing must be pressed out and the new one pressed in by means of a drift and an arbor press or by hand using a hammer.

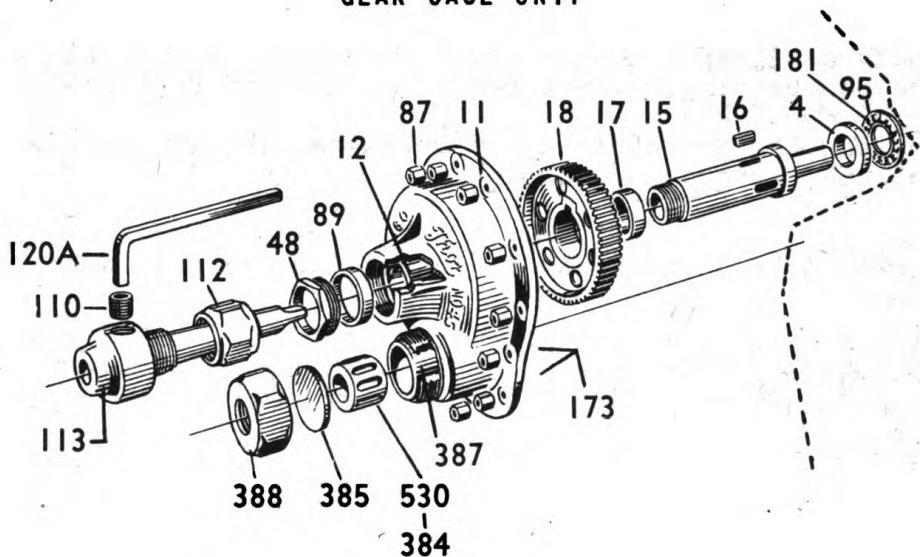
Since the inside diameter of the new No. 2 bushing will be somewhat diminished in size because of a press fit, the No. 2 bushing must be reamed by a reamer, the diameter of which corresponds to the bearing surface diameter on the No. 15 spindle which fits into the No. 2 bushing. It is very important that the No. 2 bushing be reamed in a straight line with the No. 12 gear case bushing in the No. 11 gear case assembly, otherwise the No. 15 spindle might bind at these two bushing bearings.

Completely assemble all motor parts and place unit in a clean dry place until ready for reassembling with the No. 1 gear case assembly.

When reassembling the motor parts, lubricate each part with OE-10 oil.

Application of grease lubricant to the crank chamber through the crank chamber plate openings in the No. 1 cylinder assembly may be done after the entire tool has been reassembled.

GEAR CASE UNIT



4	Race	18	Gear	112	Nut	384	Roller
11	Case	48	Box	113	Chuck	385	Plate
12	Bushing	87	Nut	120A	Wrench	387	Bushing
15	Spindle	89	Packing	173	Key	388	Cap
16	Key	95	Retainer	181	Ball	530	Bearing
17	Collar	110	Screw				

Illustration No. 10
Entire Gear Case Unit

To Remove No. 15 Spindle Assembly from No. 11 Gear Case Assembly

1. Remove the No. 113 wood bit chuck from the No. 15 spindle.
 - (a) Unscrew the No. 112 retainer nut in a counter-clockwise direction.
 - (b) Pull the No. 113 chuck from the No. 15 spindle. (In case the taper shank of chuck is tightly wedged in the taper socket of No. 15 spindle, insert a 5/16" dia. rod through the upper opening of the No. 15 spindle and tap the No. 113 chuck out from the inside.)
2. Remove the No. 48 stuffing box by unscrewing it in a clockwise rotation (LEFT HAND THREAD).
3. Hold No. 11 gear case assembly in hand and tap threaded end of the No. 15 spindle assembly against a hard wood block to drive No. 15 spindle assembly out of upper end of No. 11 gear case.

No. 18 Gear Wheel

The No. 18 gear wheel is held from turning on the No. 15 spindle by means of a No. 16 spindle key. The No. 18 gear wheel is in-

spected for worn teeth as per instructions under "Inspection of No. 107 Crank Pinion and No. 18 Gear Wheel" Page 25. If it becomes necessary to replace the No. 18 gear wheel, it is removed from the No. 15 spindle as follows:

1. Place the upper end of the No. 15 spindle loosely between the jaws of a vise so that the No. 18 gear wheel on the spindle lies across the top of the jaws.
2. Tap the threaded end of the No. 15 spindle to drive the spindle through the No. 18 gear wheel.

When reassembling, be sure the No. 17 spindle collar is placed between the No. 18 gear wheel and the shoulder on No. 15 spindle and that No. 17 spindle collar and No. 18 gear wheel are tightly pressed against the shoulder on the No. 15 spindle. A small steel chip, located between the No. 18 gear wheel and No. 17 spindle collar, or between No. 17 spindle collar and shoulder on No. 15 spindle might be enough to cause the No. 15 spindle to bind between the No. 19 upper ball race and the No. 12 gear case bushing after the No. 11 gear case assembly has been drawn up tightly to the No. 1 cylinder.

No. 89 Spindle Packing

The No. 89 spindle packing located in the No. 11 Gear Case between the No. 12 Gear Case bushing and the No. 48 Stuffing Box serves as a lubricant seal on the No. 15 spindle. It should be replaced when badly worn.

When installing a new No. 89 spindle packing, draw up the No. 48 stuffing box fairly snug in a counter-clockwise direction (LEFT HAND THREAD). As use of the tool is continued, the No. 48 stuffing box should be occasionally tightened to take up the wear on the No. 89 spindle packing.

Inspection of No. 530 Rollers and Retainer in No. 11 Gear Case

The No. 530 rollers and retainer, located in the No. 11 gear case serve as a bearing point for the lower end of the No. A28 crank.

The No. 530 rollers and retainer should be removed from the No. 11 gear case for inspection and service.

1. To remove the No. 530 rollers and retainer:
 - (a) Unscrew the No. 388 lower crank cap.
 - (b) Tap the lower end of No. 11 gear case lightly against a wood block to back the No. 530 bearing down and out.
2. Clean the bearing thoroughly in gasoline.
3. Lubricate with OE-10 oil.
4. Pack a liberal amount of GP-No. 1 cup grease into the No. 530 bearing.

26

28

Original from
UNIVERSITY OF CALIFORNIA

5. Replace the No. 385 lower crank bearing thrust plate and the No. 388 lower crank cap.

The gear case unit, having been properly serviced as described above, may now be assembled to the No. 1 cylinder by the twelve No. 86 gear case studs and No. 87 gear case stud nuts.

LUBRICATION

Grease Application Immediately After Reassembly

Before assembling the two No. 84 crank chamber plates to the No. 1 cylinder, it is very important to pack the crank chamber not more than one-third full of proper grade cup grease. This grease provides lubrication for the pistons, connecting rod bearings, crank bearings, eccentric, gear and spindle bearings.

Oil Application Immediately After Reassembling

The No. 20 and 21 right and left Corliss Valves and their operating parts are lubricated by removing the No. 7 oil plug (painted red) and pouring a liberal amount of oil into the opening. Upon operation of the drill, this oil will be carried to the above parts.

The No. 590 throttle valve is lubricated by applying oil through the open exhaust bell end and rotating the No. 65 throttle sleeve to the full limits of clockwise and counter-clockwise rotation with the No. 81 lock sleeve in its most outward position from the machine.

After the drill has been properly reassembled and lubrication applied, operate the drill slowly for at least two to three minutes so that the grease may work itself into vital points of lubrication.

The drill is now ready for service.

LUBRICATION SPECIFICATIONS

	Temperatures	U.S. Army Symbol
Oil	32° F. and below Above 32° F.	OE-10 {oil, engine, S.A.E. 10} OE-30 {oil, engine, S.A.E. 30}
Grease	32° F. and below Above 32° F.	Equal Mix of GP-No. 1 Grease and OE-10 oil GP-No. 1 Grease

Always use clean oil. Under no circumstances should old crank case oil be employed.

Oil or grease which has been standing in an open container collecting dust and dirt should not be used.

Original from

Digitized by Google UNIVERSITY OF CALIFORNIA

**INDEX
TO
PARTS LIST**

PAGE

EXPLANATION OF PARTS NUMBERS	29
SAMPLE REQUISITION	30
RULES FOR REQUISITION PREPARATION	31
EXPLODED VIEW— COMPLETE TOOL	32
CROSS SECTION—COMPLETE	34
PARTS LIST, NUMERICAL	36

PARTS LIST

CROSS SECTION VIEWS

EXPLODED VIEWS

29

EXPLANATION OF PART NUMBERS SHOWN IN

Exploded View. Page 32

Cross-Sectional Assembled Views. . Pages 34 & 35

In the exploded and cross-sectional assembled views, due to restricted space the numbers pointing to the respective parts are only the base numbers, which assist in readily determining the nomenclature or description of a given part.

These base numbers are NOT complete part numbers and should NOT be used when specifying spare or repair parts.

When entering requisitions or purchase orders for parts, designate the parts by the COMPLETE MANUFACTURER'S PART NUMBERS, WITH THE REQUIRED IDENTIFYING ALPHABETICAL AND NUMERICAL PREFIXES, according to the numerical parts list, pages 36, 37 and 38.

PREPARATION OF REQUISITIONS

SAMPLE COPY FOR USE IN THE PREPARATION OF REQUISITIONS

Rewards in QMC Form 400 for requisitioning spare parts are confined to new column headings. Until new forms are available all organizations are to continue using the present form and either type or write in corrections indicated in column headings.

Under revised heading "Nomenclature and Unit" list the article and the unit (ea for each; lb for pound, etc.). Under heading "Authorized or Maximum Level" list the authorized depot stock levels or organizational allowances given in Part III of the Corps of Engineers Supply Catalog. The total number on hand for each item is listed under "On Hand". In column

headed "Due In" enter the total quantity previously requisitioned but not delivered. For "Initial" and "Replenishment" requisitions, the sum of "Required", "Due In", and "On Hand" should equal the "Authorized or Maximum Level".

On this page is shown a sample requisition on QMC Form No. 400 which conforms to the latest revisions. The marginal notes give instructions for preparing a requisition for spare parts for Engineer equipment. Additional information on this subject is contained in section AA-1 of Part III Engineer Supply Catalog, available from the Engineer Field Maintenance Office, P. O. Box 1679, Columbus, Ohio.

- State PERIOD designation by use of one of the following terms:
 (1) "INITIAL"—first requisition of authorized allowances.
 (2) "REPLENISHMENT"—subsequent requisitions to maintain authorized allowances.
 (3) "SPECIAL"—requisitions for necessary repairs not covered by allowances.

Type "SPARE PARTS" in upper right hand corner of requisition.

Give complete shipping instructions. Special instructions for packing, marking, routing, etc., should be given at the end of the requisition.

State proper nomenclature of machine, and make, model, serial number and registration number.

Prepare a separate requisition for each different machine.

State basis or authority and date delivery is required, immediately below description of machine.

Double space between items.

Group parts required under group headings as shown in manufacturers' parts catalogs (Technical Manuals).

State manufacturers' parts numbers and nomenclature descriptions accurately and completely. Do not use abbreviations.

(SAMPLE)						
REQUISITION						
WAR DEPARTMENT Q. M. C. FORM NO. 400 Revised Apr. 1, 1943						
To: Engineer Supply Officer, COLUMBUS Quartermaster Depot, COLUMBUS, Ohio Requisition No. E-521-3-42 Date June 11, 1943 Period 1000-1010						
SHIP TO: Engineer Property Officer, Pine Camp, New York MARKED FOR: Engineer Supply Officer, 602nd Engr. Battalion, Pine Camp, N. Y.						
Requisioners By (show Signature, Rank, Organization, Destination. If different from "Ship To" include address):						
Robert E. Roe Robert E. Roe, Major, C. E., Engineer Property Officer.				John E. Doe John E. Doe, Col., C. E., Executive Officer.		
Authorized						
Part No.	XREFERENCE	ON HAND	REPLENISHMENT	DUE IN	REQUIRED	APPROVED
Nomenclature & Unit MATERIAL LEVEL						
PARTS FOR DRILL, PNEUMATIC, PORTABLE, REVERSIBLE, WOODBORING, NO. 2 HORSE TAPER, 2 INCH CAPACITY, INDEPENDENT PNEUMATIC TOOL CO., THORN SIZE 623B, MODEL NO. 958, SERIAL NO. 645879, U.S.A. REC. NO. W-1122-ENG-1587						
Basis: Repair of Disabled Equipment. Delivery is requested by June 15, 1943.						
PD-2-146	GASKET, Crank Chamber Plate	ea.	0	2	2	
PD-2-912	ROD AND PISTON, Inside Connecting	ea.	0	1	1	
PD-2-42	HEAD, Cylinder	ea.	0	1	1	
PD-1-95	RETAINER, With Balls, Complete	ea.	0	1	1	
PD-00-110	SCREW, Wood Bit Chuck Set	ea.	0	1	1	
NONEXPENDABLE ARTICLES SHOWN HAVE BEEN PLACED ON I & I REPORT, (REPORT OF SURVEY, OR STATEMENT OF CHARGES).						

*Nonexpendable items such as tools must be accounted for, when requisitioned, by a statement that they have been placed on REPORT OF SURVEY or STATEMENT OF CHARGES.

Emergency requisitions sent by telephone, telegraph or radio must always be confirmed immediately with requisition marked: "Confirming (state identifying data)."

PREPARATION OF REQUISITIONS

A Sample Requisition in the correct form for submission by the Engineer Property Officer is shown on the opposite page.

THIS SHALL BE FOLLOWED IN MAKING OUT REQUISITIONS.

In order to eliminate duplication of work, Property Officers may authorize organizations to prepare requisitions in final form, leaving requisition number space blank for completion by Property Officer.

THE FOLLOWING RULES WILL BE OBSERVED CAREFULLY
IN PREPARING REQUISITIONS FOR SPARE PARTS:

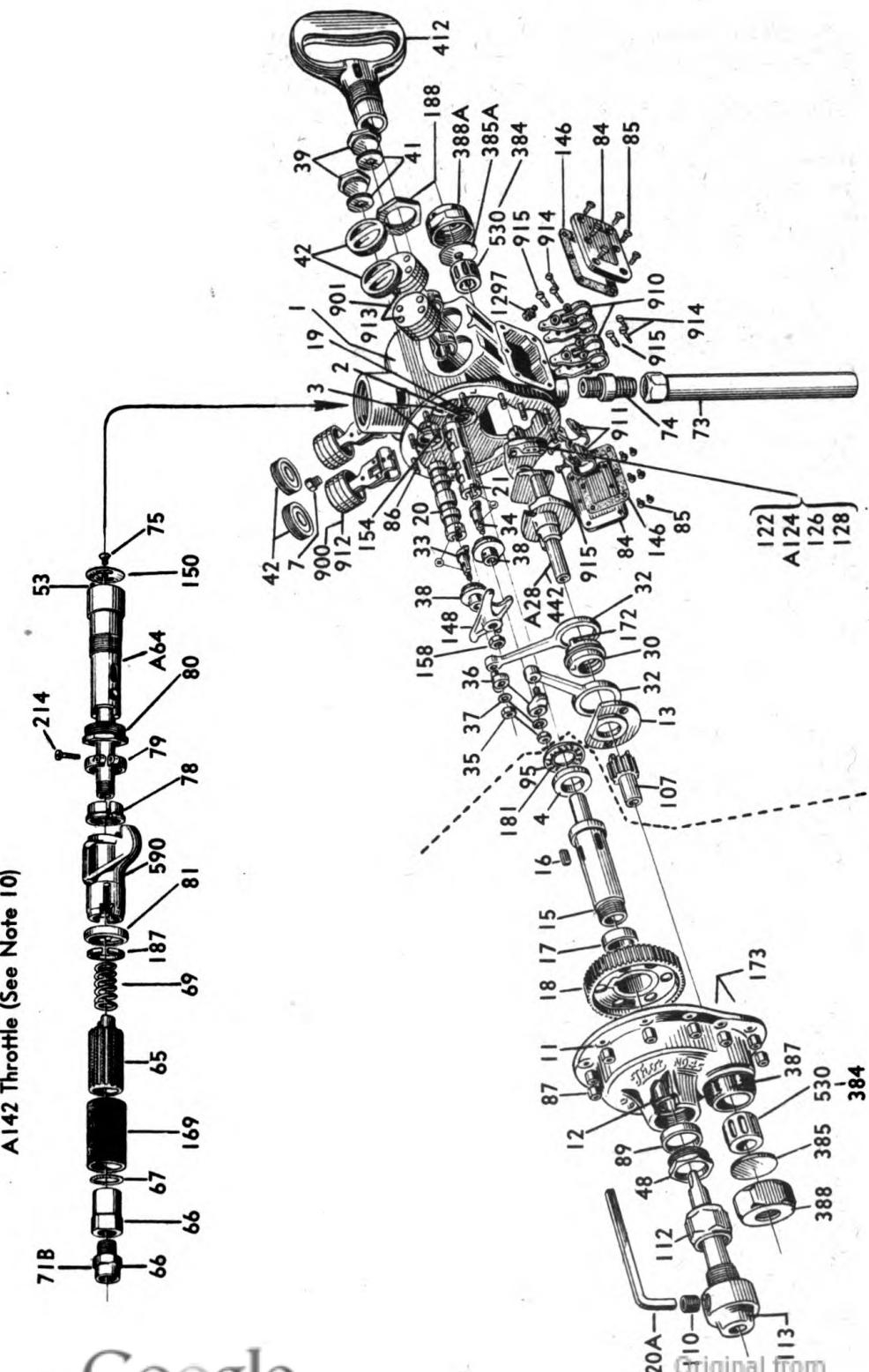
- a. Prepare a separate requisition for each different machine.
- b. Type "SPARE PARTS" in upper right hand corner of requisition form.
- c. State PERIOD designation by use of one of the following terms:
 - (1) "INITIAL" - first requisition of authorized allowances.
 - (2) "REPLENISHMENT" - subsequent requisitions to maintain authorized allowances.
 - (3) "SPECIAL" - requisitions for necessary repairs not covered by allowances.
- d. Give complete shipping instructions
- e. State proper nomenclature of machine, and make, model, serial number and registration number.
- f. State basis or authority, and date delivery is required, immediately below description of machine.
- g. Group parts required under group headings as shown in manufacturers' parts catalogs.
- h. State manufacturers' parts numbers and nomenclature descriptions accurately and completely. Do not use abbreviations.
- i. Double space between items.
- j. Emergency requisitions sent by telephone, telegraph, or radio must always be confirmed immediately with requisition marked: "Confirming (state identifying data)".
- k. Nonexpendable items must be accounted for.

30

31

EXPLODED VIEW OF COMPLETE TOOL

Numbers indicated on this page are only base numbers. For complete part number including required prefixes, and one noun description, see page 33.



**COMPLETE PARTS NUMBERS AND ONE NOUN DESCRIPTIONS FOR ITEMS
SHOWN IN EXPLODED VIEW ON PAGE 32.**

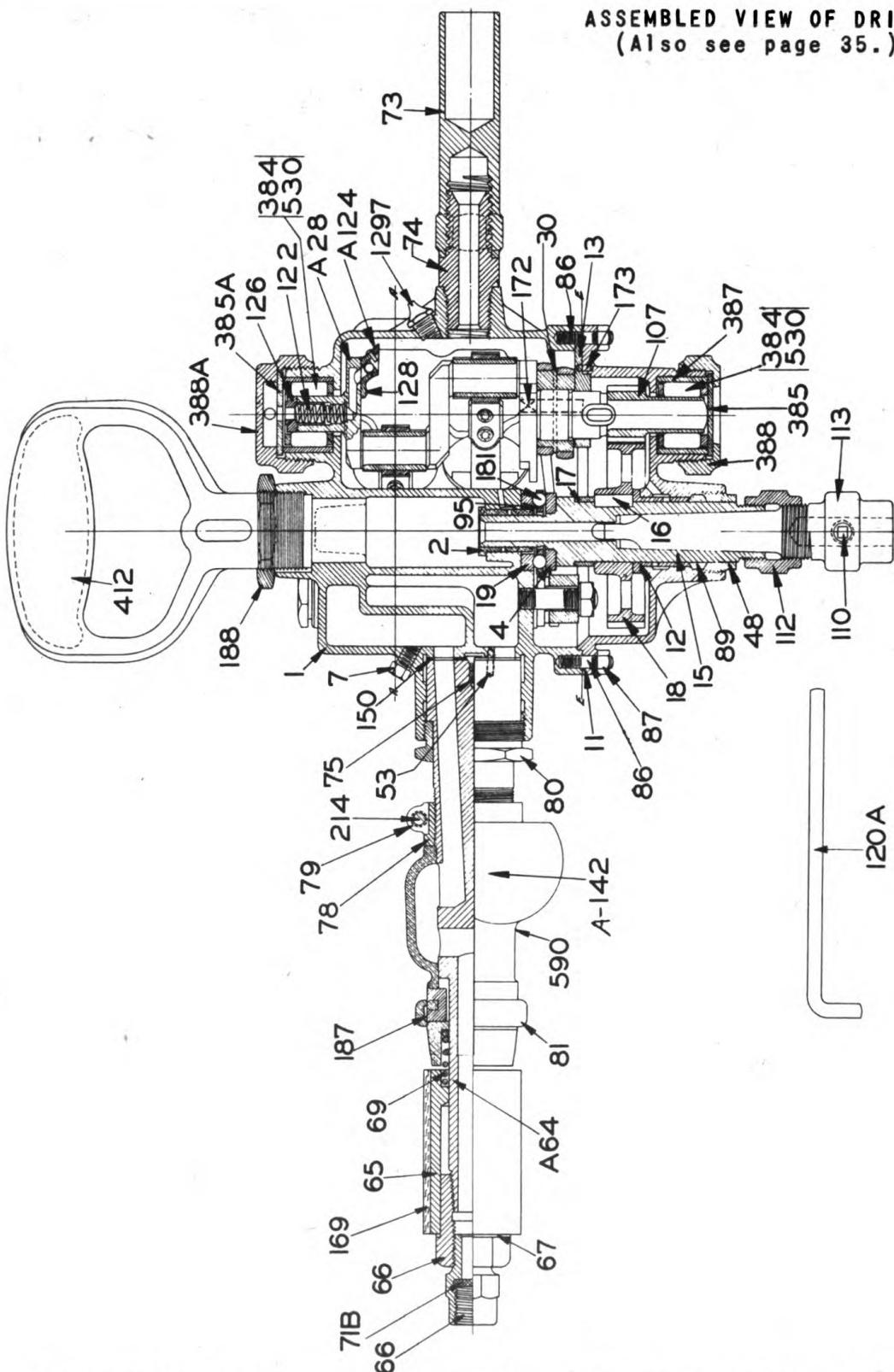
Part No.	Description	Part No.	Description
PD-12-1	Cylinder (See Note 1)	PD-2-86	Stud
PD-2-2	Bushing	PD-2-87	Nut
PD-2-3	Bushing	PD-2-89	Packing
PD-2-4	Race	PD-1-95	Retainer
PD-12-7	Plug	PD-6-107	Pinion
PD-2-11	Case (See Note 2)	PD-00-110	Screw
PD-2-13	Plate	PD-62-112	Nut
PD-2-15	Spindle (See Note 3)	PD-62-113	Chuck (See Note 6)
PD-2-16	Key	PD-6-120A	Wrench
PD-2-17	Collar	PD-2-122	Spring
PD-62-18	Gear	PD-2-A124	Mouthpiece
PD-2-19	Race	PD-2-126	Packing
PD-12-20	Valve	PD-2-128	Rivet
PD-12-21	Valve	PD-12-A142	Throttle (See Note 7)
PD-62-A28	Crank (See Note 4)	PD-2-146	Gasket
PD-2-30	Eccentric	PD-2-148	Clamp
PD-2-32	Strap	PD-12-150	Gasket
PD-2-33	Stud	PD-2-154	Stud
PD-2-34	Stud	PD-2-158	Nut
PD-2-35	Nut	PD-BW-169	Sleeve
PD-2-36	Lever	PD-2-172	Pin
PD-2-37	Washer	PD-2-173	Key
PD-2-38	Guide	PD-1-181	Ball
PD-12-39	Cap	PD-12-187	Spring
PD-2-41	Plate	PD-12-188	Nut
PD-2-42	Head	DC-2-214	Screw
PD-2-48	Box	PD-2-384	Roller
PCH-A-53	Pin	PD-2-385	Plate
PD-12-A64	Stem	PD-2-385A	Plate
PD-12-65	Sleeve	PD-2-387	Bushing
PD-12-66	Nut	PD-2-388	Cap
PR-260-66	Bushing (See Note 5)	PD-2-388A	Cap
PD-CC-67	Washer	PD-62-412	Handle
PD-12-69	Spring	PD-62-442	Shaft
PD-0-71B	Strainer	PD-2-530	Bearing (See Note 8)
PD-2-73	Handle	PD-12-590	Valve
PD-2-74	Plug	PD-2-900	Rod and Piston (See Note 9)
PD-00-75	Screw	PD-2-901	Rod and Piston (See Note 10)
PD-12-78	Nut	PD-2-910	Clamp
PD-12-79	Clamp	PD-2-911	Clamp
PD-12-80	Nut	PD-2-912	Rod and Piston
PD-12-81	Sleeve	PD-2-913	Rod and Piston
PD-2-84	Plate	PD-2-914	Screw
PD-2-85	Screw	PD-2-915	Screw
		ACK-1297	Nipple

32

NOTES

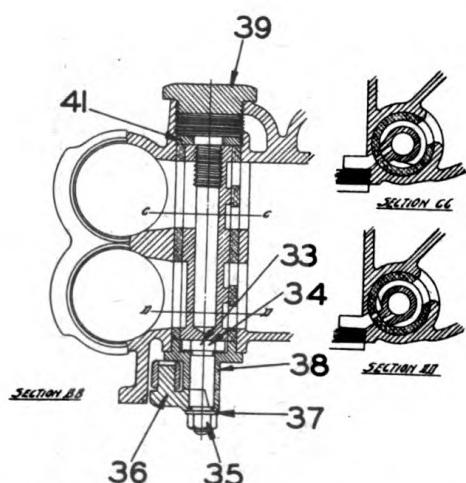
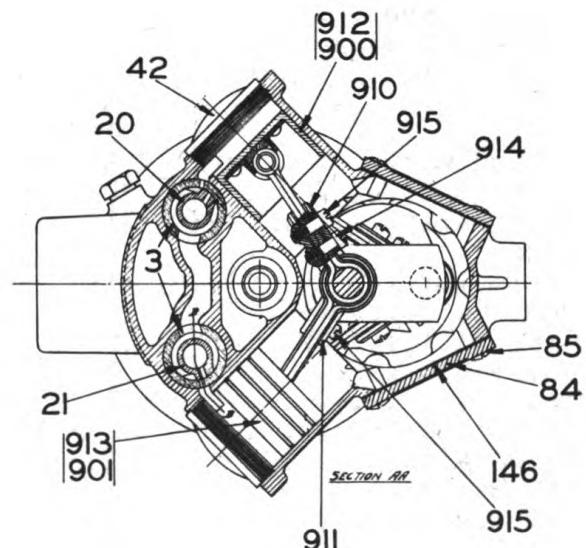
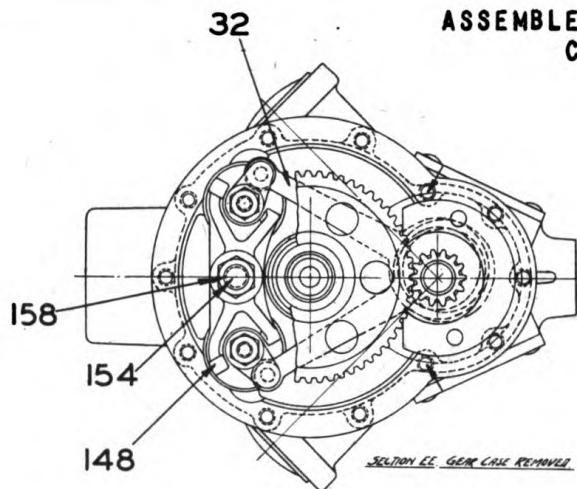
- Note 1 - Includes Nos. 2 Bushing, 3 Bushing, 19 Race, 86 Studs, 154 Stud.
- Note 2 - Includes Nos. 12 Bushing, 173 Key.
- Note 3 - Includes Nos. 4 Race, 16 Key, 17 Collar.
- Note 4 - Consists of Nos. 107 Pinion, 122 Spring, 124 Mouthpiece, 126 Packing, 128 Rivets, 442 Shaft.
- Note 5 - Includes No. 71B Strainer.
- Note 6 - Includes No. 110 Screw.
- Note 7 - Consists of Nos. A64 Stem, 65 Sleeve, 12-66 Nut, 67 Washer, 69 Spring, 75 Screw, 78 Nut, 79 Clamp, 80 Nut, 81 Sleeve, 150 Gasket, 169 Sleeve, 187 Spring, 214 Screw, 590 Valve.
- Note 8 - Includes No. 384 Rollers.
- Note 9 - Consists of Nos. 910 Clamp, 912 Rod and Piston, 914 Screws, 915 Screw.
- Note 10 - Consists of Nos. 911 Clamp, 913 Rod and Piston, 915 Screw.

ASSEMBLED VIEW OF DRILL
 (Also see page 35.)



Numbers indicated on this page are only base numbers. For complete number including required prefixes, and complete nomenclature, see numerical parts list, pages 36, 37 and 38.

ASSEMBLED VIEW OF DRILL
Continued



Numbers indicated on this page are only base numbers. For complete number including required prefixes, and complete nomenclature, see numerical parts list, pages 36, 37 and 38.

**NUMERICAL PARTS LIST FOR
62WB WOOD BORING DRILL, MODEL 958**

Mfr's. Part No.	Nomenclature	No. of Parts Per Tool	Wt. Each in Lbs.	Price Per Part
PD-12-1	Cylinder, complete (including 2, 3, 19, 86, 154) . . .	1	11-1/4	\$54.25
PD-2-2	Bushing, spindle	1		1.25
PD-2-3	Bushing, valve, with four live air holes (Right or Left)	2	1/4	2.90
PD-2-4	Race, lower ball	1		1.10
PD-12-7	Plug, oil.	1		.15
PD-2-11	Case, gear complete (including 12, 173)	1	2-1/4	12.75
PD-2-12	Bushing, gear case	1		2.25
PD-2-13	Plate, center.	1	1/4	2.90
PD-2-15	Spindle, complete (includes 4, 16, 17)	1	3/4	10.75
PD-2-16	Key, spindle	1		.20
PD-2-17	Collar, spindle.	1		.35
PD-62-18	Wheel, gear.	1	3/4	5.40
PD-2-19	Race, upper ball	1		1.60
PD-12-20	Valve, right	1	1/4	3.15
PD-12-21	Valve, left.	1	1/4	3.15
PD-62-A28	Crank, vented, complete (consisting of 107, 122, 124, 126, 128, 442)	1	1-1/4	14.50
PD-2-30	Eccentric.	1		2.90
PD-2-32	Strap, eccentric	2		2.25
PD-2-33	Stud, right valve.	1		1.80
PD-2-34	Stud, left valve	1		1.80
PD-2-35	Nut, valve stud.	2		.10
PD-2-36	Lever, valve	2		1.40
PD-2-37	Washer, valve stud	2		.05
PD-2-38	Guide, valve stud.	2		1.25
PD-12-39	Cap, exhaust	2		.95
PD-2-41	Plate, valve end	2		.40
PD-2-42	Head, cylinder	4	1/4	.95
PD-2-48	Box, stuffing.	1		2.55
PCH-A-53	Pin, throttle dowel.	1		.10
PD-12-A64	Stem, throttle	1	2	8.85
PD-12-65	Sleeve, throttle	1	1/2	2.55
PD-12-66	Nut, throttle cap.	1	1/4	1.15
PR-260-66	Bushing, reducer, with PD-0-71B Strainer	1	1/4	1.15
PD-CC-67	Washer, throttle cap nut . .	1		.05
PD-12-69	Spring, tension.	1		.35
PD-0-71B	Strainer, air.	1		.10
PD-2-73	Handle, dead	1	1	2.25
PD-2-74	Plug, dead handle.	1	1/4	1.25
PD-00-75	Screw, gasket.	1		.05
PD-12-78	Nut, valve stop.	1		.60
PD-12-79	Clamp, valve stop nut. . . .	1		1.20

PARTS LIST

37

Mfr's. Part No.	Nomenclature	No. of Parts Per Tool	Wt. Each in Lbs.	Price Per Part
PD-12-80	Nut, throttle clamp.	1	1/4	1.25
PD-12-81	Sleeve, lock, complete	1	1/4	1.25
PD-2-84	Plate, crank chamber	2	3/8	.95
PD-2-85	Screw, crank chamber plate .	12		.05
PD-2-86	Stud, gear case.	12		.15
PD-2-87	Nut, gear case stud.	12		.10
PD-2-89	Packing, spindle	1		.45
PD-1-95	Retainer, with balls, com- plete	1		1.90
PD-62-107	Pinion, crank.	1		2.90
PD-00-110	Screw, wood bit chuck set. .	1		.15
PD-62-112	Nut, wood bit chuck retainer	1	1/4	1.60
PD-62-113	Chuck, wood bit, with taper shank and PD-00-110 set screw	1	3/4	3.15
PD-6-120A	Wrench, set screw.	1		.85
PD-2-122	Spring, metal packing ten- sion.	1		.10
PD-2-A124	Mouthpiece, complete vent. .	1		1.45
PD-2-126	Packing, metal	1		.70
PD-2-128	Rivet, mouth piece and crank	2		.05
PD-12-A142	Throttle, complete (consist- ing of A64, 65, 12-66, 67, 69, 75, 78, 79, 80, 81, 150, 169, 187, 214, 590). .	1	5	21.75
PD-2-146	Gasket, crank chamber plate.	2		.10
PD-2-148	Clamp, valve guide	1	1/4	.45
PD-12-150	Gasket, throttle	1		.35
PD-2-154	Stud, valve guide clamp. . .	1		.15
PD-2-158	Nut, valve guide clamp . . .	1		.10
PD-BW-169	Sleeve, throttle sleeve rubber.	1		.35
PD-2-172	Pin, eccentric driver.	1		.20
PD-2-173	Key, center plate.	2		.10
PD-1-181	Ball, ball retainer, 1/4". .	13		.02
PD-12-187	Spring, lock sleeve.	1		.20
PD-12-188	Nut, grip handle check . . .	1		.50
DC-2-214	Screw, stop nut clamp. . . .	1		.05
PD-2-384	Rollers, for part PD-2-530 .	16		.10
PD-2-385	Plate, lower crank bearing thrust.	1		.20
PD-2-385A	Plate, upper crank bearing thrust.	1		.35
PD-2-387	Bushing, upper and lower . .	2		1.25
PD-2-388	Cap, lower crank	1	1/4	.95
PD-2-388A	Cap, upper crank	1	1/4	.95
PD-62-412	Handle, grip	1	2	2.55
PD-62-442	Shaft, crank without pinion.	1	1	12.00
PD-2-530	Bearing, roller, complete (includes PD-2-384 rollers)	2		5.00
PD-12-590	Valve, complete.	1	1-1/2	6.90
PD-2-900	Rod and Piston, complete in- side connecting (consist- ing of 910, 912, 914, 915).	2	Original fro 3/8	10.15

36

PARTS LIST

Mfr's. Part No.	Nomenclature	No. of Parts Per Tool	Wt. Each in Lbs.	Price Per Part
PD-2-901	Rod and Piston, complete outside connecting (consisting of 911, 913, 915) .	2	1/4	8.85
PD-2-910	Clamp, inside connecting rod	2		2.70
PD-2-911	Clamp, outside connecting rod	2		2.30
PD-2-912	Rod and piston, inside connecting	2	1/4	7.15
PD-2-913	Rod and piston, outside connecting	2	1/4	6.45
PD-2-914	Screw, inside connecting rod clamp	4		.10
PD-2-915	Screw, inside and outside connecting rod clamp. . . .	4		.10
ACK-1297	Nipple, cylinder zerk grease	1		.10

(NOTE: None of the nuts, screws and studs included in this parts list are standard hardware items.)

MEMORANDA

MEMORANDA

MEMORANDA

MEMORANDA

MEMORANDA

